

## Chemistry 30B

at De Anza College

## *Intro to General, Bio & Organic Chemistry (II)*

Spring 2015

section01 — CRN 42691

Introduction to General, Bio & Organic Chemistry II is the second part of a multiple part series. This 5 unit course will be taught from 04/06/2015 through 06/26/2015 with a final exam on Tuesday 06/23/2015 4-6pm. The class will be lead by Prof. Nick DeMello (email [nick@chemlectures.com](mailto:nick@chemlectures.com)).

### Course Description:

This class is for students entering the allied health fields. The focus of the second part of Introduction to General, Organic, and Biochemistry is organic and biochemistry. The topics included in organic chemistry are: hydrocarbons, alcohols, thiols, ethers, carboxylic acids, esters, amines, and amides. Various physical and chemical properties of these organic substances will be studied along with nomenclature and structural features. The topics included in biochemistry are: carbohydrates, fatty acids and lipids, amino acids and proteins, nucleic acids and DNA. Various physical and chemical properties of these biological molecules will be studied. A brief introduction to metabolism will also be discussed.

### Prerequisites:

- Required: Chemistry 30A or Chemistry 50 or Chemistry 1A.
- Recommended: English Writing 211 and Reading 211 (or Language Arts 211), or English as a Second Language 272 and 273

### Required Materials:

- Textbook, Timberlake Chemistry: An Introduction to General, Organic and Biological Chemistry, 12<sup>th</sup> Ed., Pearson / PrenticeHall 2015 ISBN 0-321-90844-9. Earlier editions **may** be acceptable (ask your instructor).
- Lab manual, Catalyst: Introduction to General, Organic and Biochemistry, custom lab manual for Chem 30A and 30B, Pearson Learning Solutions 2012 ISBN 1-256-17651-6 (available from the campus bookstore)
- A spiral bound notebook for doing problems in class, taking notes, and recording data.
- Pencils (2) with an eraser should be brought to every class.
- Internet access (answer keys, worksheets, lecture slides, and other resources will be available only online).
- Laboratory safety goggles (can be purchased at the campus bookstore) are required for all lab experiments.
- A simple scientific calculator. The calculator must do scientific notation, log and square root functions. Anything more than that is a not needed and will likely slow you down. Keep it simple. Cell phones, PDAs, smart phones, laptops, or other personal electronics devices are **not** an acceptable substitute.

## Structure

### Lecture & Discussion:

Lecture will be held from **5:30pm to 7:20pm (1 hr 50 min) Tue & Thr, in room G1 building G**. Lecture attendance is required. You must sign the daily lecture attendance sheet to have your attendance recognized — not signing the sheet is the same as not attending class. Students missing more than two consecutive lectures, more than four lectures in total, or any lectures during the first two weeks of class, may be dropped from the class.

Lectures will parallel the content in the class textbook. Prior to lecture, students are required to read the assigned textbook through the section indicated on the course schedule. Students are encouraged to write down any questions that occur during reading for discussion in lecture and to make note of definitions and formulas introduced in the text. The lecture will assume students have read the assigned sections.

## Laboratory:

Lab session will be held from **7:30pm to 10:20pm (2 hr 50 min) Wednesdays, in room 2210 building SC2**. Lab attendance is required. You must sign the daily lab attendance sheet to have your attendance recognized — not signing the sheet is the same as not attending class. This is a separate sign in sheet from the lecture attendance sheet. Two or more absences from lab may result in the student being dropped. There are no make-up labs.

Lab session will offer students the opportunity to explore many of the topics presented in the course. Each session will involve a separate, predetermined experiment from the class lab manual. Experiments are listed in the lab schedule. Students must review the experiment prior to class and complete any pre-lab questions or preparations prior to lab. Many lab activities may begin with a pre-lab quiz and require a post lab report. Students unable demonstrate proper preparation may not be allowed to participate in that days lab activity.

Most experiments will be done individually. Regardless of whether the experiment is an individual or group project, each student is individually responsible for recording all experimental data, including printing out their own copy of any spectra or other results produced in the lab. Each student is responsible for submitting their own report for every experiment.

Chemistry labs are dangerous. The chemicals we employ and study are interesting because of their tendency to change one substance into another. In other words, almost every chemical you work with is either corrosive, toxic, volatile, combustible or otherwise dangerous. Safety policies required by the college and state will be strictly enforced.

Safety policies include (but are not limited to):

- Safety goggles must be worn at all times in the lab, unless the instructor specifically tells you otherwise.
- Students must wear clothes that adequately cover legs, arms, and feet. No open toed shoes, no shorts, sleeveless shirts, etc.
- No draping or baggy clothing. Long hair must be tied back. Most lab fires start in loose hair or clothing.
- No food or drink is permitted in the lab or in the halls outside the lab. While there is adequate ventilation in the labs for most practices, many foods readily absorb chemical vapors and can become toxic in a lab environment.

A complete list of safety polices will be provided during the first lab period. Students must agree to abide by all safety polices and will be asked to sign a contract to that effect. Students violating that will be asked to leave the lab and may be dropped from the class. At the instructors discretion, points may be removed the from the students safety score instead, as a one time warning.

Reports and other assignments are due at the start of the next lab period following completion of the activity, unless your instructor specifies otherwise. Students may submit lab reports only for activities in which they participated. Missed labs will result in zero points for that activity.

## Homework:

Questions are assigned from each textbook chapter. These questions are intended to help direct study focus, provide students with the opportunity to test their preparedness for quizzes and exams, and encourage discussion of various topics within the course. Lists of homework problems for each chapters are posted on the class website and answers to each question can be found at the end of the respective chapter. Homework will not be collected.

## Exams & Quizes:

At the end of each chapter, a summary quiz (40 pts) will be given in lecture (usually the next lecture after we finish discussing it). A students best 6 scores will count towards the final course grade. Three midterm exams (120 points each) will be given according to the class schedule. Midterm exams will be held during lecture period. According to the spring final exam schedule, the Final Exam (200 points) will be from **4-6pm on Tuesday 06/23/2015 room G1 building G**.

Students are required to bring a scientific calculator, pencils (2), and an eraser to each class and these will be required for all quizzes and exams. No notes, books, scantron forms, blue books, or other materials are required or will be permitted. There are no make-up exams or quizzes. Exams and quizzes cannot be taken early. A missed exam or quiz will result in zero points for that assessment. The final exam is comprehensive and is required. Not taking the final exam will result in a failing grade for the course.

## Grading

There is no curve. There is no extra credit. Grades are based on a percentage of total points achieved to total points possible. Points are earned for quizzes, exams, lab experiments (lab report plus any pre-lab quiz), the lab practical and for lab safety. The total points expected to be offered this semester is approximately 1,000 — broken down as follows.

240 pts	Quizzes (6 scores; 40 pts each)	24%	Lecture 80%
360 pts	Midterm Exams (3 exams; 120 pts each)	36%	
200 pts	Final Exam (comprehensive; 200 pts)	20%	
120 pts	Lab Experiments (best 8 scores; 15 pts each) (total points include pre-lab & reports)	12%	Lab 20%
60 pts	Lab Exam/Practical (60 pts)	6%	
20 pts	Lab Safety	2%	
1,000 pts		100%	

Students who earn 90% or more of the available points will receive an A grade. Students who earn less than 90% but 80% or more of available points will receive a B grade. Students who earn less than 80% but 70% or more of available points will receive a C grade. Students who earn between 70% and 55% will receive a D grade.

Where allowed by campus policy, a “+” prefix will be attached to B and C grades when a student earns points in the top half of each respective range. Students who earn less than 55% of the total possible points or who fail to take the final exam will receive a failing grade for the course.

## Resources

### Chem Website 30B:

The course syllabus, schedule, topics lists, study guides, worksheets, answer keys and other class resources can be found on the chemistry website for 30B at this URL:

<http://chem.ws/30B>

### Topic Lists:

A list of the specific topics we intend to cover in lecture and lab is provided on the class website, organized by chapter of the class textbook. Additional topics may be added during the semester and not all will be tested for on in any given exam or assignment. Students are encouraged to use this topic list in preparing for lecture, reviewing chapters, exam preparation, and determining if Chemistry 30B meets the student's personal objectives in studying chemistry.

### Student Success Center:

The Student Success Center offers workshops, tutoring, and support for most De Anza classes. This is a unique and valuable resource. The center offers a great environment for study groups to meet. Students are strongly encouraged to explore and make use of the center.

- Math, Science & Technology Resource Center: S43 / 408.864.8683
- Academic Skills Center: ATC 302 / 408.864.8253
- General Subject Tutoring: ATC 304 / 408.864.8682
- Listening and Speaking Center: ATC 313 / 408.864.5385
- Writing and Reading Center: ATC 309 / 408.864.5840

Hours vary by program. See <http://www.deanza.edu/studentsuccess> for details.

## Notices

### Important Dates (Add these to your Calendar — Missed Exams cannot be made up!)

- April 7th — First Day of Class
- April 30th — Midterm Exam #1
- May 19th — Midterm Exam #2
- May 23rd - 25th — Holiday, No Classes
- June 4th — Midterm Exam #3
- June 17th — Lab Practical (Lab Exam)
- June 23rd — Final Examination

### About transitioning into a collegiate environment.

“We teach rose bushes and ivy where to grow. Infants, toddlers, and children are taught right from wrong and other essential lessons. Useful skills, necessary limits, and entertaining tricks are taught to service animals and pets. Teaching is acting upon another to cause them to know something. Out of necessity teaching is generally done without a subject's knowledge, regardless of their consent, and often against their will.

As children become adults, the educational process for them changes. We teach less and ask students to learn more. Required lessons are slowly replaced with opportunities to explore and seek out whatever knowledge a student may choose to make their own. Eventually teaching ends and young adults graduate from even our highest schools, but opportunities to learn may continue. The collegiate environment is not a school. There are no teachers here and enrollment is not required.

If you take this class, you are doing so of your own free will. You are choosing to attempt to master an extremely challenging subject. The faculty and staff of this college will do our best to assist you in your challenge. But passive attendance and simply doing as you are told will not be sufficient. The knowledge proffered here must be taken up, considered, and made your own. You face a difficult challenge. Success is not guaranteed, regardless of effort or intent.

This college also offers you the benefit of having your knowledge tested, graded and certified if you meet a level of mastery determined by the state and college. This certification is not a reward or payment for effort. It is recognition of learning, of what knowledge you succeed in making your own. It is a worthy achievement that few will accomplish. It is something to be proud of.”

### Academic Integrity Policy (from the De Anza College Catalog)

*“De Anza College is committed to excellence in the pursuit of learning and academic achievement by its students. To further this goal, the college is committed to providing academic standards that are fair and equitable to all students in an atmosphere that fosters integrity on the part of student, staff and faculty alike. The student's responsibility is to perform to the best of his/her potential in all academic endeavors. This responsibility also includes abiding by the rules and regulations set forth by individual faculty members related to preparation and completion of assignments and examinations.*

*The submission of work that is not the product of a student's personal effort, or work which in some way circumvents the given rules and regulations, will not be tolerated.*

*The following types of misconduct for which students are subject to disciplinary sanction apply at all times on campus as well as to any off-campus functions sponsored or supervised by the college: cheating, plagiarism or knowingly furnishing false information in the classroom or to a college officer.”*

Any student found pursuing any form of academic dishonesty will be subjected to disciplinary action according to the guidelines described or referenced in the College Catalog and will receive a failing grade for the course.

### Student Learning Outcomes

Upon successful completion of Chem 30B course, a student should be able to:

1. Differentiate the general reactions of the principle organic functional groups.
2. Evaluate the major classes of biological compounds from a chemical perspective.



CHEM 30 B • Intro to General, Bio & Organic Chemistry II • SPRING 2015 • Prof. DeMello

**Textbook  
Chapters**

**Lecture Section**  
5:30-7:20 PM  
1 hr 50 min

**Lab Section**  
7:30-10:20 PM  
2 hr 50 min

Week 1	Tue	4/7/15	Ch 11	Class Intro / Hydrocarbons	
	Wed	4/8/15			Orientation
	Thu	4/9/15	Ch 11	Hydrocarbons	
Week 2	Tue	4/14/15	Ch 11	Alkenes & Alkynes	
	Wed	4/15/15			Exp #10: Reactions of Hydrocarbons
	Thu	4/16/15	Ch 12	Alcohols	
	Sat	4/18/15	Last day to Add Class		
	Sun	4/19/15	Last day to Drop Class w/ Full Refund & No Grade		
Week 3	Tue	4/21/15	Ch 12	Functional Groups	
	Wed	4/22/15			Exp #11: Alcohols & Phenols
	Thu	4/23/15	Ch 12	Esters, Aldehydes & Ketones	
Week 4	Tue	4/28/15	Ch 13	Carboxylic Acids & Esters	
	Wed	4/29/15			Exp #12: Aldehydes & Ketone
	Thu	4/30/15	<b>Exam #1 (covers Ch 11-12)</b>		
	Fri	5/1/15	Last day to Request P/NP		
Week 5	Tue	5/5/15	Ch 13	Amines & Amides	
	Wed	5/6/15			Exp #13: Carboxylic Acids & Esters
	Thu	5/7/15	Ch 14	Carbohydrates	
Week 6	Tue	5/12/15	Ch 14	Polysaccharides	
	Wed	5/13/15			Exp #16: Amines & Amides
	Thu	5/14/15	Ch 15	Fatty Acids, Lipids	
Week 7	Tue	5/19/15	<b>Exam #2 (covers Ch 13-14)</b>		
	Wed	5/20/15			Exp #14: Carbohydrates
	Thu	5/21/15	Ch 15	Transport	
Week 8	Tue	5/26/15	Ch 16	Proteins	
	Wed	5/27/15			Exp #15: Glycerphospholipids & Steroids * student must bring 1 egg from home *
	Thu	5/28/15	Ch 16	Enzymes	
	Fri	5/29/15	Last day to Drop Class with "W" (withdraw)		
Week 9	Tue	6/2/15	Ch 17	Nucleic Acids	
	Wed	6/3/15			Exp #17: Synthesis of Acetaminophen
	Thu	6/4/15	<b>Exam #3 (covers Ch 15-16)</b>		
Week 10	Tue	6/9/15	Ch 17	RNA	
	Wed	6/10/15			Exp #18: Peptides & Proteins
	Thu	6/11/15	Ch 18	Metabolic Pathways	
Week 11	Tue	6/16/15	Ch 18	Energy	
	Wed	6/17/15			Lab Exam & Checkout
	Thu	6/18/15	Wrap Up, Finals Review		
Week 12	Tue	6/23/15	Final Exam (4-6pm)		

The only holidays are May 23-25, this does not overlap with any class dates. Finals week is June 23-26.  
Midterm Exams are in last hour of lecture. There are no make-up Exams, Quizzes, or Labs. Subject to change. (rev 3/28/15)



## Chemistry Lab Safety Contract

From the American Chemical Society Safety In Academic Laboratories Guidelines, 7th Ed., the following mandatory minimum safety requirements must be followed by all students and be rigorously enforced by all Chemistry faculty:

1. Chemistry Department-approved safety goggles purchased from the De Anza College bookstore (NOT safety glasses) must be worn at all times once laboratory work begins, including when obtaining equipment from the stockroom or removing equipment from student drawers, and may not be removed until all laboratory work has ended and all glassware has been returned to student drawers.
2. Shoes that completely enclose the foot are to be worn at all times; NO sandals, open-toed, or open topped shoes, or slippers, even with socks on, are to be worn in the lab.
3. Shorts, cut-offs, skirts or pants exposing skin above the ankle, and sleeveless tops may not be worn in the lab: ankle-length clothing must be worn at all times.
4. Hair reaching the top of the shoulders must be tied back securely.
5. Loose clothing must be constrained.
6. Wearing "...jewelry such as rings, bracelets, and wristwatches in the laboratory..." should not be worn to prevent "...chemical seepage in between the jewelry and skin...".
7. Eating, drinking, chewing gum, or applying cosmetics in the laboratory is forbidden at ALL times, including during lab lecture.
8. Use of electronic devices requiring headphones in the laboratory is prohibited at ALL times, including during lab lecture.
9. Students are advised to inform their instructor about any pre-existing medical conditions, such as pregnancy, epilepsy, or diabetes, that they have that might affect their performance.
10. Students are required to know the locations of the eyewash stations, emergency shower, and all exits.
11. Students may not be in the lab without an instructor being present.
12. Students not enrolled in the laboratory class may not be in the lab at any time after the first lab period of each quarter.
13. Except for soapy or clear rinse water from washing glassware, NO CHEMICALS MAY BE Poured INTO THE SINKS; all remaining chemicals from an experiment must be poured into the waste bottle provided.
14. Students are required to follow the De Anza College Code of Conduct at all times while in lab: "horseplay", yelling, offensive language, or any behavior that could startle or frighten another student is prohibited.
15. Students are strongly recommended to wear nitrile gloves while performing lab work; wear a chemically resistant lab coat or lab apron; and wear shoes made of leather or polymeric leather substitute.

By signing below, I, \_\_\_\_\_, \_\_\_\_\_,  
First Name Family Name

acknowledge that I fully understand and agree to abide by the laboratory safety rules listed above. Further, I acknowledge that my failure to abide by these rules may result in my being immediately dropped from this class.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## CHAPTER ELEVEN

The following is a list of important topics for students taking Chemistry 30B, by chapters in the course textbook (Chemistry, An Introduction to General, Organic & Biological Chemistry 12th Ed by Karen C. Timberlake). Exams and assignments will focus on helping students achieve these goals. Additional topics may be added during the semester and not all will be tested for on any given exam or assignment. Students are encouraged to use this outline to review chapters, prepare for exams, and determine if Chemistry 30B meets the student's personal objectives in studying chemistry.

### CH 11: HYDROCARBONS

3 lectures

Organic Compounds ( section 11.1 )

- Differentiate between organic and inorganic substances by composition, bond type, bond polarity, mp, bp, flammability and solubility in water.

Alkanes ( 11.2 )

- Write the IUPAC name and formula of alkane chains of up to ten carbons.
- Draw the structure of alkanes in expanded, condensed and skeletal form.
- Understand how single bond rotation produces different conformations of the same molecule.
- Name and draw cycloalkanes with three to ten carbons.

Alkanes with Substituents ( 11.3 )

- Know that alkanes may have branches or substituents.
- Understand the relationship between structural isomers.
- Using IUPAC standards, name branched chain alkanes.
- Name alkanes and cycloalkanes with methyl, ethyl, propyl, isopropyl, tert-butyl or halogen groups.
- Draw the structure and formula of substituted alkanes given their name.

Properties of Alkanes ( 11.4 )

- Identify alkanes with less than five carbons as gases at room temperature.
- Identify alkanes with five to eight carbons as volatile liquids at room temperature.
- Know that alkanes are highly combustible and commonly used as fuels.
- Understand alkanes with nine to seventeen carbons are oils and used as lubricants.
- Know paraffins are alkanes with 18+ carbons, are waxy solids, and used to coat produce.
- Know petrolatum are alkanes of 25+ carbons and are used in cosmetics and ointments.
- Know that alkanes are insoluble in water, but soluble in many non-polar solvents.
- Know that alkanes have densities less than water.
- Be able to write the combustion reaction for a given alkane.

Alkenes & Alkynes ( 11.5 )

- Understand that alkenes and alkynes are hydrocarbons with double and triple bonds, respectively.
- Understand why alkenes and alkynes are called unsaturated hydrocarbons.
- Know alkanes are saturated hydrocarbons and contain the maximum number of hydrogen atoms.
- Write the IUPAC name of alkenes and alkynes and draw their structures.
- Write the IUPAC name of substituted alkenes and alkynes and draw their structures.
- Write the IUPAC name of cycloalkenes up to ten carbons and draw their structures.

Cis-Trans Isomerism, Reactions, & Aromatics ( 11.6-11.8 )

- Understand how a double bond can lead to either of two geometric isomers.
- Understand geometric isomerism is different than conformational or structural isomerism.
- Name and draw the structure of substances which may be cis or trans isomers.
- Know the conditions and be able to predict the product of hydrogenation ( $H_2$  addition) and hydration ( $H_2O$  addition) reactions.
- Be able to draw and name single ring aromatic compounds.

## CHAPTER TWELVE

The following is a list of important topics for students taking Chemistry 30B, by chapters in the course textbook (Chemistry, An Introduction to General, Organic & Biological Chemistry 12th Ed by Karen C. Timberlake). Exams and assignments will focus on helping students achieve these goals. Additional topics may be added during the semester and not all will be tested for on any given exam or assignment. Students are encouraged to use this outline to review chapters, prepare for exams, and determine if Chemistry 30B meets the student's personal objectives in studying chemistry.

### CH 12: ALCOHOLS, THIOLS, ETHERS, ALDEHYDES & KETONES

2 lectures

Alcohols, Phenols, Thiols & Ethers ( section 12.1 )

- Understand alcohols are substituted hydrocarbons, the substituent is the hydroxyl group (-OH).
- Name and draw alcohols with skeletons of alkanes, substituted alkanes, and cycloalkanes.
- Name and draw the structure of substituted phenols.
- Understand thiols are substituted hydrocarbons, the substituent is the thiol group (-SH).
- Name and draw thiols with skeletons of alkanes, substituted alkanes, and cycloalkanes.
- Understand ethers are two hydrocarbons connected with a single oxygen ( -O- ).
- Name and draw simple ethers.

Properties of Alcohols ( 12.2 )

- Be able to identify and give examples of primary, secondary, and tertiary alcohols and thiols.
- Describe how a hydroxyl group effects the water solubility of a substance.
- Give examples of uses for alcohols, phenols, thiols, and ethers.

Aldehydes & Ketones ( 12.3 )

- Know aldehydes and ketones are hydrocarbons containing a carbonyl group (-CO-).
- Name and draw aldehydes and ketones with skeletons of substituted alkanes and cycloalkanes.

Reactions of Alcohols, Thiols, Aldehydes, & Ketones ( 12.4 )

- Identify and write combustion reactions of alcohols, using oxygen and heat.
- Identify and write dehydration reactions of alcohols, using acid and heat.
- Recognize addition of oxygen or loss of hydrogen is an oxidation reaction.
- Understand carboxylic acids are hydrocarbons containing a carboxylic acid group (-CO<sub>2</sub>H).
- Predict the product of oxidizing or reducing an alkane, alcohol, aldehyde, or carboxylic acid.
- Describe how Tollen's test indicates the presence of aldehydes.
- Describe how Benedict's test indicates the presence of aldehydes with adjacent alcohols.
- Identify the reaction or write the reaction for Tollen's test or Benedict's test.
- Recognize decreasing carbon-oxygen bonds by loss of oxygen or hydrogen addition is reduction.
- Know NaBH<sub>4</sub> or H<sub>2</sub> + catalyst (Pt or Ni) is used to reduce aldehydes and ketones to alcohols.

## CHAPTER THIRTEEN

The following is a list of important topics for students taking Chemistry 30B, by chapters in the course textbook (Chemistry, An Introduction to General, Organic & Biological Chemistry 12th Ed by Karen C. Timberlake). Exams and assignments will focus on helping students achieve these goals. Additional topics may be added during the semester and not all will be tested for on any given exam or assignment. Students are encouraged to use this outline to review chapters, prepare for exams, and determine if Chemistry 30B meets the student's personal objectives in studying chemistry.

### CH 13: CARBOHYDRATES

2 lectures

#### Carbohydrates ( section 13.1 )

- Understand where the name carbohydrate originates.
- Understand how photosynthesis and respiration form the carbon cycle and produce sugars.
- Draw and recognize the structure of a simple monosaccharide.
- Understand that disaccharides & polysaccharide are composed of multiple monosaccharides.
- Recognize and differentiate between monosaccharides that are either aldose or ketose.
- Be able to classify, draw and give the IUPAC name of monosaccharide composed of 4-6 carbons.

#### Chiral Molecules ( section 13.2 )

- Understand how stereoisomers (also called optical isomers) differ from structural isomers.
- Recognize whether a shape is chiral or achiral.
- Recognize when a substituted carbon produces a chiral shape.
- Know that molecules with a chiral shape are enantiomers of molecules that are their mirror image.
- Understand that enantiomers are different substances, with different properties.
- Read and draw Fisher projections to express the chirality at carbon centers along a backbone.
- Understand how D and L designations are used to classify monosaccharide stereoisomers.

#### Monosaccharides, Structure ( section 13.3-13.4 )

- Know the Fisher structure and name of both enantiomers of Glucose, Galactose, and Fructose.
- Understand the kinds of foods that provide D-Glucose and D-Galactose.
- Understand what is meant by the term "lactose intolerant."
- Understand why D-Fructose is used in some foods in place of D-Glucose.
- Understand the equilibrium between open and closed forms of hexoses.
- Be able to interconvert between Haworth and Fisher structures of hexoses.
- Understand how mutarotation causes interconversion between alpha and beta Haworth structures.
- Be able to draw and name the alpha and beta isomers of D-Glucose, D-Galactose, and D-Fructose

#### Monosaccharides, Properties ( section 13.5 )

- Name and draw the acids formed from oxidation of monosaccharides w/ Benedict's reagent.
- Predict the structure and name of the alditols produced from reduction of monosaccharides.

#### Disaccharides ( section 13.6 )

- Recognize and be able to draw the structures of maltose, lactose, and sucrose.
- Identify the glycosidic bond in disaccharides.
- Know common food sources of maltose, lactose, and sucrose.

#### Polysaccharides ( section 13.7 )

- Understand that polysaccharides are polymers of monosaccharides.
- Understand the polysaccharides amylose (a straight chain) and amylopectin (a branched chain) are ways plants store glucose as starches.
- Understand the polysaccharide glycogen is how glucose is stored in animal muscles and liver.
- Understand cellulose is a straight chain polysaccharide that gives wood its structural integrity.
- Understand why some animals can digest cellulose, but humans cannot.