

# NORCO COLLEGE ANNUAL INSTRUCTIONAL PROGRAM REVIEW

**Unit: Chemistry**

*Please give the full title of the discipline or department. You may submit as a discipline or department as is easiest for your unit*

**Contact Person: Dr. Siobhan S. F. Freitas and Dr. Stanley Tyler**

**Due in draft: March 15, 2015**

**Final drafts due: April 29, 2015**

Please send an electronic copy to the Vice President; Academic Affairs

Norco: [Diane.Dieckmeyer@norcollege.edu](mailto:Diane.Dieckmeyer@norcollege.edu)

If you are CTE: [Kevin.Fleming@norcollege.edu](mailto:Kevin.Fleming@norcollege.edu)



*Form Last Revised: December 2014*

**Norco College**

Web Resources: <http://www.rccd.edu/administration/educationalservices/ieffectiveness/Pages/ProgramReview.aspx>

# Annual Instructional Program Review Update

## Instructions

**\*Please retain this information for your discipline's/department's use (or forward to your chair).**

The Annual Self-Study is conducted by each unit on each college and consists of an analysis of changes within the unit as well as significant new resource needs for staff, resources, facilities, and equipment. It should be **submitted in draft every year by March 15th** (or the first working day following the 15<sup>th</sup>), with final drafts due on **April 29th**, in anticipation of budget planning for the fiscal year, which begins July 1 of the *following* calendar year.

**For Program Review data, please go to the following link:**

<http://www.norcocollege.edu/about/president/strategic-planning/programreview/Pages/index.aspx>

The questions on the subsequent pages are intended to assist you in planning for your unit.

The forms that follow are separated into pages for ease of distribution to relevant subcommittees. **Please keep the pages separated** if possible (though part of the same electronic file), **with the headers as they appear**, and be sure to include your unit, contact person (this may change from topic to topic) and date on each page submitted. Don't let formatting concerns slow you down. If you have difficulty with formatting, Nicole C. Ramirez can adjust the document for you. Simply add responses to those questions that apply and forward the document to [nicole.ramirez@norcocollege.edu](mailto:nicole.ramirez@norcocollege.edu) with a request to format it appropriately.

If you cannot identify in which category your requests belong or if you have complex-funding requests please schedule an appointment with your college's Vice President for Business Services right away. They will assist you with estimating the cost of your requests. For simple requests such as the cost of a staff member, please e-mail your Vice President. It is vital to include cost estimates in your request forms. Each college uses its own prioritization system. Inquiries regarding that process should be directed to your Vice President.

**Norco: VP Business Services 951-372-7157**

## **Mission**

Norco College serves our students, our community, and its workforce by providing educational opportunities, celebrating diversity, and promoting collaboration. We encourage an inclusive, innovative approach to learning and the creative application of emerging technologies. We provide foundational skills and pathways to transfer, career and technical education, certificates and degrees.

## **Vision**

Norco – creating opportunities to transform our students and community for the dynamic challenges of tomorrow.

## **Goals and Strategies 2013-2018**

### **Goal 1: Increase Student Achievement and Success**

Objectives:

1. Improve transfer preparedness (completes 60 transferable units with a 2.0 GPA or higher).
2. Improve transfer rate by 10% over 5 years.
3. Increase the percentage of basic skills students who complete the basic skills pipeline by supporting the development of alternatives to traditional basic skills curriculum.
4. Improve persistence rates by 5% over 5 years (fall-spring; fall-fall).
5. Increase completion rate of degrees and certificates over 6 years.
6. Increase success and retention rates.
7. Increase percentage of students who complete 15 units, 30 units, 60 units.
8. Increase the percentage of students who begin addressing basic skills needs in their first year.
9. Decrease the success gap of students in online courses as compared to face-to-face instruction.
10. Increase course completion, certificate and degree completion, and transfer rates of underrepresented students.

## **Goal 2: Improve the Quality of Student Life**

### Objectives:

1. Increase student engagement (faculty and student interaction, active learning, student effort, support for learners).
2. Increase frequency of student participation in co-curricular activities.
3. Increase student satisfaction and importance ratings for student support services.
4. Increase the percentage of students who consider the college environment to be inclusive.
5. Decrease the percentage of students who experience unfair treatment based on diversity-related characteristics.
6. Increase current students' awareness about college resources dedicated to student success.

## **Goal 3: Increase Student Access**

### Objectives:

1. Increase percentage of students who declare an educational goal.
2. Increase percentage of new students who develop an educational plan.
3. Increase percentage of continuing students who develop an educational plan.
4. Ensure the distribution of our student population is reflective of the communities we serve.
5. Reduce scheduling conflicts that negatively impact student completion of degrees and programs.

## **Goal 4: Create Effective Community Partnerships**

### Objectives:

1. Increase the number of students who participate in summer bridge programs or boot camps.
2. Increase the number of industry partners who participate in industry advisory council activities.
3. Increase the number of dollars available through scholarships for Norco College students.
4. Increase institutional awareness of partnerships, internships, and job opportunities established with business and industry.
5. Continue the success of Kennedy Partnership (percent of students 2.5 GPA+, number of students in co-curricular activities, number of students who are able to access courses; number of college units taken).
6. Increase community partnerships.
7. Increase institutional awareness of community partnerships.
8. Increase external funding sources which support college programs and initiatives.

## **Goal 5: Strengthen Student Learning**

### Objectives:

1. 100% of units (disciplines, Student Support Service areas, administrative units) will conduct systematic program reviews.
2. Increase the percentage of student learning and service area outcomes assessments that utilize authentic methods.
3. Increase the percentage of programs that conduct program level outcomes assessment that closes the loop.
4. Increase assessment of student learning in online courses to ensure that it is consistent with student learning in face-to-face courses.
5. Increase the number of faculty development workshops focusing on pedagogy each academic year.

## **Goal 6: Demonstrate Effective Planning Processes**

### Objectives:

1. Increase the use of data to enhance effective enrollment management strategies.
2. Systematically assess the effectiveness of strategic planning committees and councils.
3. Ensure that resource allocation is tied to planning.
4. Institutionalize the current Technology Plan.
5. Revise the Facilities Master Plan.

## **Goal 7: Strengthen Our Commitment To Our Employees**

### Objectives:

1. Provide professional development activities for all employees.
2. Increase the percentage of employees who consider the college environment to be inclusive.
3. Decrease the percentage of employees who experience unfair treatment based on diversity-related characteristics.
4. Increase participation in events and celebrations related to inclusiveness.
5. Implement programs that support the safety, health, and wellness of our college community.

# I. Norco College Annual Instructional Program Review Update

Unit: \_\_\_\_\_Chemistry\_\_\_\_\_

Contact Person: Siobhan S. F. Freitas\_\_\_\_\_

Date: \_\_\_\_\_April 2, 2015\_\_\_\_\_

## Trends and Relevant Data

### 1. Have there been any changes in the status of your unit? (if not, please indicate with an “N/A”)

a. Has your unit shifted departments?  
No.

b. Have any new certificates or complete programs been created by your unit?  
Not this year.

c. Have activities in other units impacted your unit? For example, a new Multi Media Grant could cause greater demand for Art courses.  
No this year.

### 2. List your retention and success rates as well as your efficiency. Have there been any changes or significant trends in the data? If so, to what do you attribute these changes? Please list Distance Education, retention, success and efficiency separately.

	Success Rate (%)	Retention Rate (%)	Average Efficiency*
2010-2011	63.84	75.95	620.85
2011-2012	65.22	81.36	673.06
2012-2013	59.91	78.13	625.60
2013-2014	68.95	84.99	551.96

\* I requested annual average efficiency rates from our Institutional Research office, for a cleaner comparison.

- Regarding the dip in success rates for 2012-2013: The students were not as strong this year as in other years. This was noted by both full time

chemistry professors. We have a very small pool of students who continue on after chemistry 2A, and so strong and weak classes make a difference in the success rates.

- Regarding Improved Retention and Success Rates in 2013-2014: The improvements we are seeing probably are due to two factors. First, the inclusion of STEM Supplemental Instruction, which started in the of Spring 2014 for the chemistry 2A courses, has had a positive influence on the chemistry 2A courses. My colleagues have expressed similarly good experiences which seem to result from the Stem Supplemental Instruction. Second, I have noted that the students that started Chemistry 2A (the very first course in the chemistry sequence) in Spring 2014 have been a particularly strong class, as well. I am now teaching some of this set of students in chemistry 1B, and it too is a particularly strong class, so that also plays a role. Sometimes, we simply get more talent in some years than others.
- The Efficiency rates are generally strong. Our classes tend to fill to capacity; however, we introduced organic chemistry (CHE-12A) in the spring of 2014 and that class had a lower enrollment as newly introduced courses often do, so that may be the reason for the lower efficiency rate in the spring of 2014.
- All Chemistry courses are face-to-face; the chemistry discipline has no distance education component.

**3. What annual goals does your unit have for 2015-2016 (please list the most important first)? Please indicate if a goal is directly linked to goals in your comprehensive. How do your goals support the college mission and the goals of the [Educational Master Plan](#)?**

List the goals of your unit for 2015-2016	List activity(s) linked to the goal	Relationship of goal to mission and master plan	Indicate if goal is limited to Distance Education
<p><b>Obtain an increase in our chemistry supplies budget so that we may plan fiscally as well as pedagogically for our growing chemistry program.</b> We have the administrative approval and support to offer 2 organic chemistry courses <u>per semester</u>; however, we have had no increase in our annual supplies budget or equipment repairs budget to support this very expensive course offering.</p>	<p>Demonstrate to the administration the cost of offering these extra courses (added general chemistry and added organic chemistry courses) via itemized costs for supplies (attached as appendix A). Continue requesting appropriate supply budget increases for our expanding chemistry program (both general and organic) from the Norco College administrators.</p> <p>So far, we have paid for these</p>	<p><b><u>Goal 6: Demonstrate Effective Planning Processes</u></b>  <b>Ensure that resource allocation is tied to planning.</b></p> <p>Also  <b><u>Goal 1: Increase Student Achievement and Success</u></b>  <b>Obj. 1, 2, 6, 7, and 10.</b></p>	<p>Not part of a Distance Education plan.</p>

	courses via one-time funds obtained by the Dean of Instruction, and higher level administrators. We have been told we will receive an increase in budget, but it did not occur in this fiscal year.		
<b>Offer CHE-12B for the first time at Norco College (it will be offered in Fall 2015 and again in Spring 2015).</b>	Finish determining which experiments to offer; purchase chemicals and equipment required for the experiments and student lockers.	<b>Goal 1:</b> Increase student achievement and success by improving transfer preparedness. <b>Mission:</b> We provide foundational skills and pathways to transfer, career and technical education, certificates and degrees.	Not part of a Distance Education plan.
<b>Become approved for Chemistry ADT</b>	Apply for the Chemistry ADT (we applied spring 2015).	<b>Goal 1:</b> Increase student achievement and success by improving transfer preparedness. <b>Mission:</b> We provide foundational skills and pathways to transfer, career and technical education, certificates and degrees.	Not part of a Distance Education plan.

*\*Your unit may need assistance to reach its goals. Financial resources should be listed on the subsequent forms. In addition you may need help from other units or Administrators. Please list that on the appropriate form below, or on the form for "other needs."*

# Norco College Annual Instructional Program Review Update

Unit: \_\_\_\_\_ Chemistry \_\_\_\_\_  
 Contact Person: \_\_\_\_\_ Freitas / Tyler \_\_\_\_\_  
 Date: \_\_\_\_\_ April 3, 2015 \_\_\_\_\_

## Current Human Resource Status

4. Complete the Faculty and Staff Employment Grid below. Please list full and part time faculty numbers in separate rows. Please list classified staff who are full and part time separately:

Faculty Employed in the Unit			
Teaching Assignment (e.g. Math, English)	Full-time faculty or staff (give number)	Part-time faculty or staff (give number)	Distance Education
Chemistry courses	2	5	0

Classified Staff Employed in the Unit			
Staff Title	Full-time staff (give number)	Part-time staff (give number)	Distance Education
Lab Technician – There is one full-time Lab Technician who is primarily dedicated to chemistry (ordering and equipment oversight), other lab technicians (both full and part-time) work, to varying degrees, to assist the primary chemistry lab technician in supporting chemistry classes. The one	4	1	0

full-time chemistry lab technician also assists in other disciplines (biology primarily) in the same way that he receives help from others.			

2015

Unit Name : \_\_\_\_\_ Chemistry \_\_\_\_\_

## 5. Staff Needs

### NEW OR REPLACEMENT STAFF (Administrator, Faculty or Classified)<sup>1</sup>

<p>List Staff Positions Needed for Academic Year _____ <u>2015</u> _____            Please justify and explain each faculty request as they pertain to the goals listed in item #3. Place titles on list in order (rank) or importance.</p>	<p>Indicate (N) =            New or (R) =            Replacement</p>	<p>Annual            TCP*</p>	<p>Distanced            Education</p>
<p><b>1. Chemistry is supported by 2 full-time lab technicians, who also split their time in the other science disciplines. One of those technicians is expected to retire in June, 2015. Although he is staff, and therefore his replacement should be automatic, the chemistry discipline wants to state some reasons why this Staff Replacement should be ranked very highly, in case budget constraints do not allow for all of the replacements to be hired in the next fiscal year.</b></p> <p>Reason: A) There is currently more work required than can be done by the three lab technicians. B) Chemistry is adding 2 more organic chemistry classes per year starting Fall 2015. The ordering alone takes up a significant amount of time, as does the set-ups for these experiments. We need one lab technician devoted to <u>organic chemistry</u> who can take responsibility for a) organic ordering and b) can be available to <u>help with the courses (so he/she would not concurrently have responsibilities in biology or physics)</u> because both synthesis and instrument work requires more supervision than can be done by the one faculty member supervising the class. c) It would be extremely helpful to the discipline if we hired a new lab technician who is able to work with the many instruments we now have for use in the organic classes. <u>We need a second lab technician who can take the primary responsibility for ordering and setting up of all of the other chemistry classes.</u> We hope to add two more courses to our list of classes in the next five years, so that our students don't have to leave Norco to complete their chemistry education, except for upper division courses. (CHE-2B and CHE-3 should be offered here).</p>	<p><b>R*</b></p> <p>Noted here due to urgency of hire.</p>	<p><b>\$96,245 (II)</b></p>	<p><b>n/a</b></p>
<p><b>2. Organic Chemistry full-time faculty member.</b>            A tenure track full-time chemistry professor position to keep up with the expanded program of instruction. Ideally this professor would be able to teach any of our chemistry courses</p>	<p><b>N</b></p>	<p><b>\$ 123,881+            \$4,000 for            office.</b></p>	<p><b>n/a</b></p>

<sup>1</sup> If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the "reason" section of this form.

<p>with equal familiarity but should definitely be capable of teaching Organic Chemistry as part of his/her full-time teaching load.</p> <p><u>Reason:</u> A third professor well-versed in Organic Chemistry will be essential to help us keep up with growth needs to provide a section of first semester and a section of second semester organic chemistry each semester. Our soon to be approved ADT requires both General Chemistry and Organic Chemistry for our students. It is particularly difficult to find adjunct professors capable of teaching organic chemistry (Chem 12A, Chem 12B). With three full-time professors our search each semester for qualified adjunct professors could then concentrate on filling our need for Intro Chem and General Chem instructors to keep up with expansion of those course offerings. Note that students that do not seek a Chem ADT still need Intro Chem or General Chem as a prerequisite to successfully enter into the Biology courses geared toward the bio ADT. We need Intro Chem/Gen Chem adjuncts each semester. Qualified ones are hard to find but not as hard to find as Organic Chem adjunct. That is why we seek a full-time position specifically for an Organic Chemistry professor.</p>			
<p>3. <u>Reason:</u></p>			
<p>4. <u>Reason:</u></p>			
<p>5. <u>Reason:</u></p>			
<p>6. <u>Reason:</u></p>			

\* TCP = "Total Cost of Position" for one year is the cost of an average salary plus benefits for an individual. New positions (not replacement positions) also require space and equipment. Please speak with your college Business Officer to obtain accurate cost estimates. Please be sure to add related office space, equipment and other needs for new positions to the appropriate form and mention the link to the position. Please complete this form for "New" Classified Staff only. All replacement staff must be filled per Article I, Section C of the California School Employees Association (CSEA) contract.

Requests for staff and administrators will be sent to the [Business and Facilities Planning Council](#). Requests for faculty will be sent to the [Academic Planning Council](#).

Unit Name: \_\_\_\_\_ Chemistry \_\_\_\_\_

## 6. Equipment (including technology) Not Covered by Current Budget<sup>2</sup>

List Equipment or Equipment Repair Needed for Academic Year <u>2015</u> Please list/summarize the needs of your unit on your college below. Please be as specific and as brief as possible. Place items on list in order (rank) or importance.	*Indicate whether Equipment is for (I) = Instructional or (N) = Non-Instructional purposes	Annual TCO*				
		Cost per item	Number Requested	Total Cost of Request	EMP GOALS	Distance Education
1. Corrosive Cabinet, <b>Self Closing</b> Reason: <b>(cabinet has corroded and must be replaced).</b> This item is included in our request for equipment list, Equipment set 1	Workplace Safety / Non-instructional	\$2,599	1	\$2,599	7.	
2. Annual site license for Wavefunction, Inc. chemical modeling software program called SPARTAN Student Model. This is being listed as technology because it is neither a consumable material or supply good nor capital equipment. Reason: We currently have a one-year site license for this program. It is a valuable addition to laboratory organic chemistry and contrasts chemical modeling (calculations of energy states, stability, physical traits, reactivity, etc.) for virtually any compound as opposed to more traditional chem lab experiment that are performed to learn about handling equipment, chemicals, understand basic reactions and syntheses while working with real chemicals. By having some lab sessions be about chemical modeling, the cost of chemicals can be held down some with no loss in the students' learning opportunities.	Instructional	\$2250	1	\$2250	NA	NA

\* Instructional Equipment is defined as equipment purchased for instructional activities involving presentation and/or hands-on experience to enhance student

<sup>2</sup> If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the "reason" section of this form.

learning and skills development (i.e. desk for student or faculty use).

Non-Instructional Equipment is defined as tangible district property of a more or less permanent nature that cannot be easily lost, stolen or destroyed; but which replaces, modernizes, or expands an existing instructional program. Furniture and computer software, which is an integral and necessary component for the use of other specific instructional equipment, may be included (i.e. desk for office staff).

\*\* These requests are sent to the [Business and Facilities Planning Council](#).

Unit Name:     Chemistry    

### 7. Professional or Organizational Development Needs Not Covered by Current Budget\*<sup>3</sup>

<b>List Professional Development Needs for Academic Year 2014-2015</b> Reasons might include in response to assessment findings or the need to update skills to comply with state, federal, professional organization requirements or the need to update skills/competencies. Please be as specific and as brief as possible. Some items may not have a cost per se, but reflect the need to spend current staff time differently. Place items on list in order (rank) or importance. Examples include local college workshops, state/national conferences.	Annual TCO*				
	Cost per item	Number Requested	Total Cost of Request	EMP Goals	Distance Education

<sup>3</sup> If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the “reason” section of this form.

<p><b>1. Request that full-time professors receive support to attend a professional development workshop or conference on green chemistry.</b></p> <p>Reason: Green chemistry is a rapidly advancing field of chemistry that applies to both organic and inorganic (the general chemistry) curriculum as well as commercial, private, and government workplaces. The training is vital because it will enable the faculty to deliver the environmentally responsible values that are now being adopted nationwide: that less toxic chemicals and smaller quantities of chemicals, can be used effectively in college-level instruction (and in industrial processes). The adoption of this philosophy will reduce waste products and costs and contribute to a healthier environment in the classroom and the workplace. Currently, only a small fraction of textbooks have adopted this philosophy. Short courses are available to a limited number of attendees each year at places such as the University of Oregon under the sponsorship of NSF. ACS sponsored courses are offered at various venues throughout the year. Attendance at one of these conferences would quickly pay dividends (financially as well as environmentally) to our chemistry program.</p> <p>A second type of workshop is a water quality training course. There are many, many aspects to water quality, and “short courses”, many of which are offered throughout the year, would be an excellent way to improve the current skills of the faculty member interested in this.</p> <p>In general, these workshops and conferences have registration fees of approximately \$500, and a \$400-500 plane ticket, and the rest is for hotel, car rental and meals during the workshop or conference. Conferences often last 5 days. Workshops vary from 2-5 days.</p>	<p>(N) \$1,500 Per person</p>	<p>2 people</p>	<p>\$3000.00</p>	<p>NA</p>	<p>NA</p>
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\*It is recommended that you speak with the Faculty Development Coordinator to see if your request can be met with current budget.

\*\* These requests are sent to the [Professional Development Committee](#) for review.

Unit Name: \_\_\_\_\_ Chemistry \_\_\_\_\_

**8. Student Support Services, Library, and Learning Resource Center** (see definition below\*) Services needed by your unit over and above what is currently provided by student services at your college. Requests for Books, Periodicals, DVDs, and Databases must include specific titles/authors/ISBNs when applicable. Do not include textbook requests. These needs will be communicated to Student Services at your college<sup>4</sup>

<p align="center"><b>List Student Support Services Needs for Academic Year <u>2015</u></b></p> <p align="center">Please list/summarize the needs of your unit on your college below. Please be as specific and as brief as possible. Not all needs will have a cost, but may require a reallocation of current staff time.</p>	<p align="center"><b>EMP GOALS</b></p>	<p align="center"><b>Distance Education</b></p>
<p><b>1. Tutors for all levels of chemistry</b>  <u>Reason:</u> <u>There is</u> always a fraction of students who need help, at all levels of chemistry, in order to either pass the course or earn an honor grade instead of the grade that they can earn without assistance.</p>	<p><b>Goal 1: Increase Student Achievement and Success Objectives 1,6,10.</b></p>	
<p><b>2.</b>  <u>Reason:</u></p>		
<p><b>3.</b>  <u>Reason:</u></p>		
<p><b>4.</b>  <u>Reason:</u></p>		
<p><b>5.</b>  <u>Reason:</u></p>		

\*Student Support Services include for example: tutoring, counseling, international students, EOPS, job placement, admissions and records, student assessment (placement), health services, student activities, college safety and police, food services, student financial aid, and matriculation.

\*\* These requests are sent to the [Student Services Planning Council](#) and the [Library Advisory Committee](#).

<sup>4</sup> If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the “reason” section of this form.

Unit Name: Chemistry

**9. OTHER NEEDS AND LONG TERM SAFETY CONCERNS not covered by current budget<sup>5</sup>**

**\*\* For immediate hazards, contact your supervisor \*\***

<p><b>List Other Needs that do not fit elsewhere.</b> Please be as specific and as brief as possible. Not all needs will have a cost, but may require a reallocation of current staff time. Place items on list in order (rank) or importance.</p>	Annual TCO*				
	Cost per item	Number Requested	Total Cost of Request	EMP Goals	Distance Education
<p>As already stated in Section 3, our supplies budget is inadequate to cover the costs of the courses we are currently offering. Appendix A is an itemized list of glassware supplies, and chemical supplies. Some of the supply items exceed the \$200 limit for supplies, but due to the nature of their use (such as the filters) the items are not able to be repaired, and so qualify as supplies.</p>	See Appendix A			<p><b>Goal 6:</b> <b>Obj.3</b> Ensure that resource allocation is tied to planning. <b>Goal 1:</b> <b>Increase Student Achievement and Success</b> <b>Obj. 1, 2, 6, 7, and 10.</b></p>	

requests are sent to the [Business and Facilities Planning Council](#), but are not ranked. They are further reviewed as funding becomes available.

These

<sup>5</sup> If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the “reason” section of this form.

## Rubric for Annual Instructional Program Review - Part I only

Discipline:

Contact Person:

Reviewer:

Average Score:

Area of Assessment	<b>0 No attempt</b>	<b>1 some attempt</b>	<b>2 good attempt</b>	<b>3 outstanding attempt</b>
<b>1. Retention, success, and efficiency rates have been identified and reflected upon</b>	No attempt to list retention, success, or efficiency data	Limited attempt to identify or discuss identified data	Clear attempt to identify and discuss identified data	Substantial attempt to identify and discuss/interpret identified data
<b>2. There are annual goals for refining and improving program practices.</b>	No annual goals stated	Limited/generic statement made regarding goal(s), lacks clarity or details	Clear statement made regarding goal(s), includes details	Well-defined statement made regarding goal(s), includes details, reasoning
<b>3. Activities identified that support annual goals; connections made between goals/activities and Retention, Success, Enrollment, and Efficiency data</b>	No attempt made to identify activities	Limited/generic statement about activities; very limited attempt to connect to data from question 2 (where logical)	Clearly stated activities that support the goal(s); clear connection made to data from question 2 (where logical)	Well-defined activities that logically support the goal(s); definitive connections made to data from question 2 (where logical)
<b>4. The annual goals are linked to the Mission and Educational Master Plan (EMP) of NC.</b>	No link between the annual goals and the Mission or EMP	Limited attempt to link goals to Mission and EMP	Clear attempt to link goals to Mission and EMP	Well defined connection made between goals and Mission and EMP
<b>5. Resource requests have reasons identified and completed data fields, including estimated dollar amount.</b>	No reasons identified and incomplete data fields; or reasons identified, but incomplete or empty data field	Limited/generic/basic reasons provided, data fields completed	Clear requests for resources, all data fields fully completed	Well defined reasons for resources, all data fields fully completed
<b>6. Linkages made between EMP/Strategic Plan Goals (SPG) with reasons for resource requests</b>	No linkage made between resource requests and EMP/SPG	Limited/generic/basic connection made between resource requests and EMP/SPG	Clear connection made between resource requests and EMP/SPG	Strong connection made between resource requests and EMP/SPG
<b>7. The document is complete</b>	No; there are incomplete sections	/	/	Yes; all sections are completed
<b>Column scores</b>				

Additional comments:

## II. Norco College - Annual Assessment Update

**Purpose** – The purpose for completing an annual review is to provide an opportunity for reflection on all that has been accomplished and learned from your efforts in assessment. Assessments conducted in isolation from each other will yield interesting, important, or neutral information in and of themselves, but taking a holistic look back on the unit’s accomplishment over the past year might also yield some insight. The annual review is a time to take stock of which courses and programs have undergone some scrutiny, and subsequently should help with planning for the upcoming year. This planning might include considering which other courses are ready for an initial assessment, or which might need a loop-closing assessment. Things we might learn in one cycle of assessment might actually help us to plan assessments in the next cycle, or might facilitate changes in other courses that weren’t even included in the initial assessment. To this end, please complete the following with as much detail as possible. If you have any questions, please contact either Sarah Burnett at sarah.burnett@norcollege.edu, or Greg Aycock at greg.aycock@norcollege.edu.

1. Identify where you are in the cycle of SLO assessment for each course you assessed over the past year (*fall 2013 - spring 2014*). Each response will be individualized; this means each completed column might look a little different due to the nature of the cycle of assessment in which we engage. For example, you may have a course in which you are implementing improvements to close the loop on an initial assessment that was completed in a different year. You might also have a course that only has an initial assessment with report and you haven’t yet completed any follow-up or improvement activities. Below you will see an example of how to fill in this section, and then a blank chart for your own responses.

Course number and name	SLO <i>Initial Assessments</i> and completed <b>Reports</b> (State each SLO e.g., SLO 1)	SLOs with <i>Improvements identified</i> (Identify the SLO with # of improvements in ( ) e.g., SLO 1(1), or SLO 3(0) )	SLOs not needing improvement (assumed loop-closed), with clear reasoning as to why	SLOs involved in <i>Loop-Closing</i> assessment (state SLO and effect)
EAR 20 Child Development	SLO 1, SLO 3 <i>(Indicates the discipline assessed and wrote a report for both SLO 1 and 3 in the past year for this course)</i>	SLO 1(2) <i>(Indicates 2 adjustments were made to the course e.g., in materials, assignment, test questions, pedagogy, curriculum etc. Notice, nothing is stated for SLO 3 – suggesting no concerns were identified...see the next column...)</i>	SLO 3 – results meet discipline set standards of 75% success <i>(If no improvement is needed please state why in this column)</i>	SLO 1 – data indicate increased success after improvements were made <i>(This means a closing the loop assessment was completed on SLO 2 for EAR 20)</i>

Course number and name	SLO <i>Initial Assessments</i> and completed <b>Reports</b> (State each SLO e.g., SLO 1)	SLOs with <i>Improvements identified</i> (Identify the SLO with # of improvements e.g., SLO 1(1), or SLO 3(0) )	SLOs not needing improvement (assumed loop-closed), with clear reasoning as to why	SLOs involved in <i>Loop-Closing</i> assessment (state SLO and effect)
CHE-12A	SLO 1, SLO 2, SLO 5 were assessed and reported on for program review in 2014. These were re-assessed for Fall 2014 semester. In addition, both Spring 2014 and Fall 2014 have been assessed for SLO 3 and SLO 4 for this year's program review.	Based on comparing Spring 2014 to Fall 2014 for SLO 1, SLO 2, and SLO 5, there was slight improvement in SLO 1 and SLO 2 in successive semesters and noticeable improvement in SLO 5 in the Fall 2014 compared to Spring 2014.  By reexamining final lab scores for all students for specific labs performed in Spring 2014 and then examining those same labs by all students in Fall 2014 I was able to come up with a way to assess SLO 3 and SLO 4. There was slight improvement in lab scores for these labs representing SLO 3 and SLO 4 between the two semesters.		SLO 5 improved through the use of an in-class worksheet on FTIR questions that immediately followed a lecture on the subject.

2. a) How many Program Level Outcome *initial* assessments were you involved in fall 2013 - spring 2014? Indicate a total number per column. Please provide copies of any reports or documents related to these assessments as attachments to this Annual Review, or embed at the end of the document as an Appendix.

AOE (Area of Emphasis)	ADT (Associate for Transfer)	GE (General Education)	Certificate
None.	None	None.	None

b) How many Program Level Outcome *loop-closing* assessments were you involved in fall 2013 - spring 2014? Indicate a total number per column. Please provide copies of any reports or documents related to these assessments as attachments to this Annual Review, or embed at the end of the document as an Appendix.

AOE (Area of Emphasis)	ADT (Associate for Transfer)	GE (General Education)	Certificate
None	None	None.	None.

3. Please describe any changes you made in a course or a program as a response to an assessment. Please indicate the impact the changes had on student learning, student engagement, and/or your teaching.

In Chemistry 12A (taught by Stanley Tyler), the course offering was initiated with the Spring 2014 semester. For that reason, this Program Review 2015 is comparing the assessment for Spring 2014 to that of Fall 2014 (the second and only other time this course has been offered and the semester completed). Based on the initial Chem 12A assessment reported on in Program Review 2014, I was able to improve student learning for SLO 5 by providing a detailed in-class worksheet on FTIR spectra immediately following the lecture on that subject (i.e. students did noticeably better in Fall 2014 than in Spring 2015). This was true for both the mid-semester midterm questions on FTIR and the Final Exam questions on FTIR. The lecture was given in week 8 of instruction during both semesters. Homework on the subject was assigned in Spring 2014 but in addition, an in-class worksheet was assigned immediately after the lecture in Fall 2014. I will work on assessing the Spring 2015 semester of Chem 12A after it is completed. My analysis will be ready for the next round of assessments and program review.

Can you identify any assessments that have prompted a change in perspective in the manner in which your discipline should modify the Course Outlines of Record (COR) or the Student Learning Outcomes (SLO)? Please expand on what you think should be modified.

4. Have you shared your assessments, outcomes, improvements etc. with your discipline? How? If not, how do you plan to do so in the future?

In the future, there will be an annual training meeting for full and part-time faculty to discuss assessments.

Regarding Chemistry 2A, and Chemistry 1A assessments: in the past, the information has not been shared with part-time faculty, and there was (prior to 2009) only one full-time faculty member. The culture of assessment that existed at that time was: Have all part-time faculty members assist in obtaining data for assessments, but the assessments themselves were created and analyzed by just one full-time faculty member. This culture persisted until fairly recently for chemistry 1A and 2A. The interpretation of results obtained from this type of assessment participation, is that without discussion and investment from the part-time faculty involved in teaching the classes, it is very hard to achieve meaningful

improvements. (It is also hard to generate meaningful improvements when the part-time faculty change regularly, and the degree of student abilities varies so much from semester to semester).

The current approach (instituted Spring 2015) is that both full time chemistry faculty (Dr. Freitas and Dr. Tyler) meet with as many part-time faculty as are willing and able to participate. Then the assessment instrument is made in a collaborative approach over email, and a set of common final exam questions are generated and a rubric created for analysis. Each instructor will analyze his own class with a common rubric. Then each submits the raw data (photocopies of the final exam page) and the class section analysis. The full-time faculty member responsible for the course will generate a report averaging all section results for a particular course.

The next (annual) training session will include a discussion of the assessment data and numerical analyses from the previous year (or two if appropriate), and the agenda will include a discussion of how to interpret the previous results. This discussion should inform the next agenda item: determine whether to keep, alter or throw out the previous assessment. If the assessment is deemed finished, look at SLOs and determine what concepts should be assessed in the current year.

5. Did any of your assessments indicate that your discipline or program needs additional resources to support student learning? If so, please explain.

No.

6. What additional support, training, etc. do you need in the coming year regarding assessment?  
Support from the Science chair that associate faculty who choose not to participate in assessment training and assessment reports are given lower hiring priority than those who do participate in annual assessment training and assessment reports, all other qualifications being about equal.

## Scoring Rubric for Annual Program Review of Assessment (Part II only)

Assessment Unit Name: \_\_\_\_\_

Average score \_\_\_\_\_

	0	1	2	3
<b>On-going SLO assessment and Loop-closing activity</b>	No evidence provided  0	Limited evidence of on-going SLO assessment (1 initial assessment, no loop-closing)  1	Clear evidence of on-going SLO assessment (at least 1 initial and or 1 loop-closing)  2	Clear and robust evidence provided of on-going SLO assessment (2 initial, and one loop-closing )  3
<b>Attempts to improve student learning</b>	No indication of any changes made to any courses, and no clarification provided  0	No indication of any changes made to any courses and limited clarification regarding discipline standards  1	Evidence of an attempt to implement a change in a course provided, or simple clarifying statement regarding why no specific improvement is needed  2	Multiple attempts made to implement changes to courses, discipline, institution, or state specific standards, or clear clarification why no improvement is needed  3
<b>Dialogue across the discipline</b>	No dialogue or attempt to communicate results  0	Limited demonstration of dialogue or communication within the discipline or department  1	Clear demonstration of dialogue and sharing of assessment within discipline or department  2	Robust and systematic dialogue and communication demonstrated within discipline  3
<b>Participation in PLO assessment (bonus points averaged into total score)</b>		Engagement in at least 1 initial PLO assessment <b>and/or</b> Engagement in at least 1 PLO closing-the-loop assessment fall '13-spr '14  1		

2015

## APPENDIX A

- 2. What annual goals does your unit have for 2015-2016 (please list the most important first)? Please indicate if a goal is directly linked to goals in your comprehensive. How do your goals support the college mission and the goals of the [Educational Master Plan](#)?**

### **Increased Supplies Budget Needed for Academic Year 2015-2016.**

Priority 1:

Supplies required to continue functioning safely and appropriately.

Priority 2:

Supplies that are required to offer the expanded organic chemistry offerings.

Priority 2 supplies are in 2 places; supplies such as glassware are in the first set of tables; chemical supplies are added after the glassware table.

Priority 3

Supplies that are required to complete a second set of chemistry 1A lockers; we do not have enough supplies to complete 2 sets of lockers in chemistry 1A, but we are offering 2 courses simultaneously. We are currently sharing items, but this has proven to have some logistical challenges.

New: We also want to order smaller volumetric flasks which will enable us to reduce chemical waste for the general chemistry sequence.

<b>Supply Items Priority 1</b>	<b>Vendor</b>	<b>Catalog #</b>	<b>Price</b>	<b>Quantity Needed</b>	<b>Total</b>
Progard TL1 Pretreatment Pack w/o	EMD Millipore	PROGTLOS1US	379.86	3	1230.75
Prepak L1 Presystem Pack w/o	EMD Millipore	PRPKLOS1US	360.36	3	1167.57
Reservoir Vent Filter/CO2 Trap, Elix Water	EMD Millipore	3TANKMPK01	145.86	3	472.59
Oakton Waterproof pHTestr 30 big display	Fisher	13-200-263	177.5	5	887.5
Replacement 100mL Nalgene GC's	Fisher	08-572-7D	129.8	1 pack of 12	129.8
Polypropylene spatulas	Fisher	14-955-551	36	2 packs of 300	72
Self Close Adapter Kit, Steel to retrofit our current cabinets to comply with updated OSHA standards	Grainger	5PW16	374	2	748
Condensers	ChemGlass	MW-42-01	28.07	25	701.75
DI Water Bottles	Fisher	03-409-23M	43	4 packs	172
Nalgene Tubing 3/16 ID for O Chem	Fisher	14-176-14	96	2 cases	200
Nalgene Tubing 5/16 ID for G Chem	Fisher	14-176-32	206	2 cases	412
Cuvettes	Fisher	14-385-900A	279	2 packs	560
Eudiometers	Fisher	S32356	56.25	40	2250
				<b>Total</b>	<b>9003.96</b>
<b>Supplies Priority 2</b>					
Spatula, one end tapered other flat blade	Fisher	S50822	53	2 packs	106
Single end microspatula	Fisher	21-401-15	107	2 packs	214
Hayman Spatula	Fisher	21-401-25B	19	25	475
5mL pipets	Fisher	13-665K	150	2 cases	300
10mL pipets	Fisher	13-665M	172	2 cases	344
1mL pipets	Fisher	13-665A	140	2 cases	280
Forceps	Fisher	22-327-379	31	20	620
Utility clamp	Fisher	05-769Q	52	20	1040
Aluminum Block	Fisher	K720200-0001	59	20	1180
Hirsch Funnel	VWR	89038-140	356	2 cases	712
Crystallizing Dish	Fisher	08-762-7	401	2 cases	802

1 dram vial	Fisher	02 992 763	145	1 case		145
4 dram vial	Fisher	02 992 303	208	1 case		208
2 mL Pipet Pump	Fisher	13-683-27B	29		20	580
10mL Pipet Pump	Fisher	13-683C	40		20	800
Filtering Tube	Fisher	K748021-1030	26		20	520
10mL Beaker	Fisher	02-540C	79	3 cases		237
20mL Beaker	Fisher	02-540E	68	3 cases		204
50mL Beaker	Fisher	02-540G	68	3 cases		204
100mL Beaker	Fisher	02-540H	72	3 cases		216
Glass Stir Rods	Fisher	S63448	29	2 packs		58
Magnetic Stir Bars	Fisher	22-127-100	18	1 case		726
Aluminum Block Thermometer	Fisher	K309180-0290	26		20	520
Microscale Organic Chemistry Kit	VWR	LK-15000-100	729		12	8748
Screw Cap E-Flask	Fisher	K749400-0025	198	2 packs		400
Condensers	ChemGlass	MW-42-01	28.07		25	701.75
				<b>Total</b>		<b>20340.75</b>

### Supplies, Priority 3

Utility Clamp, needed for 1A and extras	Fisher	02-216-212	36		30	1080
Crucibles, needed for 1A and 1B and replacements	Fisher	FB-965-B	216	2 cases		432
Crucible covers	Fisher	FB-965-R	408	2 cases		816
Forceps	Fisher	16-100-114	9		30	270
Safety Lighters	Fisher	12007	72	3 cases		216
Clay Triangle	Fisher	15-285C	44	6 packs		264
Tongs	Fisher	15-193	58		25	1450
volumetric flasks , 50 mL (and/or 25 mL)	Fisher	10-200B	642.27	4 cases		2569.08
				<b>Total</b>		<b>7097.08</b>

## **List of chemicals needed for Spring 2015 and Fall 2016 Organic Chemistry 12A Lab**

This list includes all chemicals cross-referenced against the experiment it is used for. It includes consumable materials as well as chemicals along with all costs of purchasing, shipping and hazardous handling where applicable. Additional information (on non-cost items) regarding such things as chemical waster storage, instruments needed to complete experimental analysis, and other are included with each experiment for completeness. The list begins at the top of the next page.

<b>Chemicals and Supplies for Microscale Experiments in Lehman book</b>	<b>Expt. Number</b>	<b>per 10 students</b>	<b>total (4x) needed</b>	<b>total (5x) needed</b>	<b>Quantity</b>	<b>Cost plus tax</b>	<b>shipping &amp; hazmat</b>
3 M HCl (3.5 mL conc. HCl)	1A	14 mL	56 mL	70 mL			
sodium benzoate [109169]	1A	5.2 g	20.8 g	26 g	25 g	12.53	216.00
heptane (0.684 g/mL)	1B	4 mL	16 mL	20 mL	100 mL	36.29	see J5
2-propanol (0.786 g/mL)	1B	4 mL	16 mL	20 mL	1 L	56.16	see J5
ethyl acetate (0.901 g/mL)	1B	4 mL	16 mL	20 mL	4 L	59.63	29.75
chlorobenzene (1.106 g/mL)	1B	4 mL	16 mL	20 mL	100 mL	55.84	see J5
bromobenzene (1.495 g/mL)	1B	4 mL	16 mL	20 mL	100 mL	30.35	see J5
6 M HCl (7 mL conc. HCl)	2	14 mL	56 mL	70 mL			
dichloromethane [D65100]	2	105 mL	420 mL	525 mL	2 L	120.53	see J5
"Panacetin"	2	5.2 g	20.8 g	26 g			
acetanilide [112933]	2	2.6 g	10.4 g	13 g	100 g	25.81	see J5
phenacetin [235830]	2	2.6 g	10.4 g	13 g	50 g	24.30	see J5
aspirin [132926]	2	2.1 g	8.4 g	10.5 g	100 g	17.82	see J5
sucrose [179949] or powdered sugar	2	0.5 g	2.0 g	2.5 g	1000 g	99.58	see J5
sodium bicarbonate, 5%	2	110 mL	440 mL	550 mL			
<b>Waste Container: CH<sub>2</sub>Cl<sub>2</sub> recovery</b>	2						
acetanilide [112933]	3	0.25 g	1.00 g	1.25 g	see I15	see I15	see I15
phenacetin [235830]	3	0.25 g	1.00 g	1.25 g	see I16	see I16	see I16
<b>melting point tubes</b>	3	80	320	400			
methyl salicylate [M80504]	4	3.4 mL	13.6 mL	17 mL	500 mL	46.98	see J5
salicylic acid [105910]	4	0.25 g	1.00 g	1.25 g	500 g	32.83	see J5

6 M sodium hydroxide	4	33 mL	132 mL	165 mL
3 M sulfuric acid	4	35 mL	140 mL	175 mL

<b>Chemicals and Supplies for Microscale Experiments in Lehman book</b>	<b>Experiment Number</b>	<b>per 10 students</b>	<b>total (4x) needed</b>	<b>total (5x) needed</b>	<b>Quantity</b>	<b>Cost plus tax</b>	<b>shipping + hazmat fee</b>
acetic acid, glacial [109088]	7	2.6 mL	10.4 mL	13 mL			
isoborneol [113901]	7	5.0 g	20.0 g	25 g	50 g	73.66	see J5
sodium bisulfite [243973], saturated aq.	7	1.0 mL	4.0 mL	5.0 mL	100 g	23.76	see J5
sodium hypochlorite, 6.0% aq. [Clorox]	7	57 mL	228 mL	285 mL			
<b>starch-iodide paper</b>	7	~20 strips	~80 strips	~100 strips			
<b>Waste Container: NaOCl solution</b>	7						
cyclohexane [C100307]	8	4 mL	16 mL	20 mL			
cyclopentane [C111805]	8	4 mL	16 mL	20 mL	500 mL	160.92	see J5
hexane [139386]	8	4 mL	16 mL	20 mL	1 L	112.86	see J5
heptane [H2198]	8	4 mL	16 mL	20 mL			
2,3-dimethylpentane [D173207]	8	4 mL	16 mL	20 mL	50 g	268.92	see J5
2,4-dimethylpentane [D173401]	8	4 mL	16 mL	20 mL	25 g	210.06	see J5
methylcyclohexane [M37889]	8	4 mL	16 mL	20 mL	100 mL	50.87	see J5
3-methylpentane [M66005]	8	4 mL	16 mL	20 mL	100 mL	49.68	see J5
<b>melting point capillary tubes</b>	8	12	48	60			
<b>10 <math>\mu</math>L Drummond microcaps (optional)</b>	8	6	24	30			
<b>refractometer</b>	8	1	1	1			
<b>Waste Container: hydrocarbons</b>	8						

cloves, whole	10	13 g	52 g	65 g			
sodium sulfate, anhydrous [207853]	10	5.0 g	20.0 g	25.0 g	see I87	see I87	see I87
dichloromethane [D65100]	10	120 mL	480 mL	600 mL	see I13	see I13	see I13
<b>spice grinders (or ca. 4 mortars/pestles)</b>	10	1 grinder	4 grinders	5 grinders			
<b>infrared spectrometer</b>	10	1	1	1			
<b>Waste Container: clove residue</b>	10						
<b>Waste Container: CH<sub>2</sub>Cl<sub>2</sub> recovery</b>	10						

Chemicals and Supplies for Microscale Experiments in Lehman book	Experiment Number	per 10 students	total (4x) needed	total (5x) needed	Quantity	Cost plus tax	shipping + hazmat fee
10% acetone/hexanes	9	90 mL	360 mL	450 mL			
acetone [179973]	9	9.0 mL	36.0 mL	45.0 mL	16 L	473.04	see J5
hexanes [178918]	9	81.0 mL	324.0 mL	405 mL	1 L	64.15	see J5
50% acetone/low-boiling petroleum ether	9	104 mL	416 mL	520 mL			
acetone [179973]	9	52 mL	208 mL	260 mL	see I77	see I77	see I77
petroleum ether [184519]	9	52 mL	208 mL	260 mL	500 mL	40.18	see J5
alumina, activated, neutral [199974]	9	25 g	100 g	125 g	100 g	43.09	see J5
hexanes [178918]	9	90 mL	360 mL	450 mL	see I78	see I78	see I78
0.025% (w/v) iodine/hexane solution	9	1.0 mL	4.0 mL	5.0 mL			
hexanes [178918]	9	1.0 mL	4.0 mL	5.0 mL	see I78	see I78	see I78
iodine [207772]	9	0.25 mg	1.00 mg	1.25 mg	5 g	31.75	see J5
sodium sulfate, anhydrous [207853]	9	2.0 g	8.0 g	10.0 g	500 g	47.63	see J5
10% aq. Potassium carbonate	9	65 mL	260 mL	325 mL			
KCaCO <sub>3</sub> ·1.5H <sub>2</sub> O [243558]	9	8.5 g	34.0 g	42.5 g	1 kg	110.16	see J5
sodium chloride [310166], saturated sol.	9	130 mL	520 mL	650 mL	500 g	34.02	see J5



68592]								
2-octanone [O4709]	11A	1.2-1.5 mL	4.8-6.0 mL	6.0-7.2 mL				
5% sodium bicarbonate	11A	25 mL						
3:1 toluene/petroleum ether dvlpng soln.	11A	380 mL ??	1520 mL	1900 mL				
(use lesser amt. for 6.7x10 cm TLC)		or 240 mL??	960 mL	1200 mL				
petroleum ether, bp 35-60 [184519]		95 or 60 mL			1 L	63.18	see J113	
toluene [ 179965]		285 or 180						
polyethylene film [Glad Cling Wrap, etc.]	11A	1 m. sq.	4 m. sq.	5 m. sq.				
TLC sheets, 20 x 20 cm, silica gel [Kodak 13179]	11A	2 or 3	8 or 12	10 or 15	25 pc/ea	166.32	50.00	
cut sheets into six 6.7x10 cm pieces								
a methyl ketone from list above	11B	minimal	minimal	minimal				
(each student gets the same one he's assigned in 11A but treated as unknown by each student in 11B)		amount of each ketone	amount of each ketone	amount of each ketone				
deuteriochloroform (CDCl3) [xxxxxx]	11B				50 g	26.57	see J113	
<b>NMR Instrument</b>	11B	1	1	1				
ethanol, absolute	12	145 mL	580 mL	725 mL	4 L	227.69	see J161	
(1R)-(+)-a-pinene, tech [P45680]	12	33 mL	132 mL	165 mL	500 g	204.40	see J115	
<b>polarimeters</b>	12	1-3 per lab						
<b>Waste Container: polarimetry solutions</b>	12							
<b>Chemicals and Supplies for Microscale Experiments in Lehman book</b>	<b>Experiment Number</b>	<b>per 10 students</b>	<b>total (4x) needed</b>	<b>total (5x) needed</b>	<b>Quantity</b>	<b>Cost plus tax</b>	<b>shipping + hazmat fee</b>	
acetic acid, glacial [109088]	23	10 mL (10 g)	40 mL	50 mL				
1.0 M bromine/acetic acid	23	14 mL 0.72 mL (2.2g)	56 mL	70 mL				
<b>bromine [277576] acetic acid, glacial [109088]</b>		13 mL (14g)	2.88 mL	3.60 mL	50 mL	98.83	122.50	
trans-cinnamic acid [C80857]	23	2.0 g	8.0 g	10.0 g	100 g	20.37	see J131	

cyclohexene [125431]		1.0 mL (0.8g)	4.0 mL	5.0 mL			
ethanol, 50% (v/v)	23	20 mL	80 mL	100 mL	see I115	see I115	see I115
<b>molecular model kits</b>	23		1 per student				
cyclohexene	24	33 mL	132 mL	165 mL			
35% hydrogen peroxide [349887] <b>or 30%!!</b>	24	145 mL	580 mL	725 mL			
30% hydrogen peroxide [216763] <b>or 35%!!</b>	24	175 mL	700 mL	875 mL			
potassium bisulfate [223476]	24	5.2 g	20.8 g	26.0 g	500 g	127.44	78.25
sodium tungstate dihydrate [223336]	24	6.5 g	26.0 g	32.5 g	100 g	95.90	see J171
starch-potassium iodide test paper	24	25 strips	100 strips	125 strips			
tricaprylmethylammonium chloride [205613]	24	6.5 g	26.0 g	32.5 g	250 mL	61.02	see J171
<b>infrared spectrometer</b>	24	1	1	1			
						4756.56	780.93

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