

# Course Student Learning Outcomes Assessment

**CHEM 209 Introductory Chemistry**

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## **General Information (Course Student Learning Outcomes Assessment)**

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## Standing Requirements

### Course Description

Basic concepts of matter: atomic structure formulas equation writing nomenclature gases and kinetic theory. Emphasizes properties of solutions and the mole concept in quantitative chemistry. Prepares students for Biology and Chemistry 219.

### Course Student Learning Outcomes

#### CHEM 209 Introductory Chemistry Outcome Set

Outcome	
Outcome	Mapping
Outcome 1 Describe chemical events through utilization of equations and solve problems using chemical concepts.	<b>Institutional Student Learning Outcomes:</b> Act 1, Act 3, Communicate 1, Learn 1, Learn 3, Think 1, Think 2
Outcome 2 Perform experiments with given directions and collect valid scientific data.	<b>Institutional Student Learning Outcomes:</b> Act 1, Communicate 1, Learn 1, Think 1, Think 2

## 2014-2015 Assessment Cycle

### Measurements

#### Outcomes and Measures

### CHEM 209 Introductory Chemistry Outcome Set

#### Outcome

##### Outcome 1

Describe chemical events through utilization of equations and solve problems using chemical concepts.

▼ **Measure:** Chem 209 SLO 1 (Lecture)  
Course level; Direct - Exam

**Description of Measurement Tool:** We used a common final exam as 25 multiple choice questions to give to all four sections assessed. The exam had some concept questions and some calculation based problems.

**Criteria for Success: Individual & Collective Student Criterion:** A successful student must score 60% or higher correct on the common multiple choice questions. The SLO is achieved when a minimum of 70% of the students taking the course are successful in achieving the outcome.

**Cycle of Assessment:** This SLO is assessed every Fall semester.

**Who is Responsible for Assessment Activity?:** The instructor of record is responsible for administering the assessment. The Lead instructor for the course is responsible for compiling the data and sharing results with the department. The Lead instructor for Chem 209 in Fall 2014 was Jeffrey Wada

##### Outcome 2

Perform experiments with given directions and collect valid scientific data.

▼ **Measure:** Chem 209 SLO 2 (Lab)  
Course level; Direct - Other

**Description of Measurement Tool:** As a method of assessment, we used laboratory reports as a way to assess both B and C in SLOs. A full laboratory report of Experiment #9 (Stoichiometry) will be used to assess these SLOs. A rubric will be used to standardize grading of the lab report and help identify the features we are looking for in students' performance. The students are asked to perform the gravimetric analysis experiment over a laboratory period. Directions to perform the experiment are given in the laboratory manual. The students will be evaluated on their ability to follow procedure, collect their data and perform the necessary calculations. Success is achieved when at least 70% of the students score earn a developing or accomplished score on the lab report.

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**Cycle of Assessment:** The SLO is assessed every Fall semester.

**Who is Responsible for Assessment Activity?:** The instructor of record is responsible for administering the assessment. The Lead instructor for the course is responsible for compiling the data and sharing results with the department. The Lead instructor for Chem 209 in Fall 2014 was Jeffrey Wada

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## Findings

### Finding per Measure

#### CHEM 209 Introductory Chemistry Outcome Set

##### Outcome

##### Outcome 1

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##### ▼ Measure: Chem 209 SLO 1 (Lecture) Course level; Direct - Exam

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**Who is Responsible for Assessment Activity?:** The instructor of record is responsible for administering the assessment. The Lead instructor for the course is responsible for compiling the data and sharing results with the department. The Lead instructor for Chem 209 in Fall 2014 was Jeffrey Wada

##### Findings for Chem 209 SLO 1 (Lecture)

**Summary of Findings:** Number of students assessed: 114

Number of sections: 4

Average correct answers for each section: 17.5(70.0%), 18.7(74.8%), 18.9(75.6%), 17.3(69.2%),

Average answers for all sections combined: 17.98(71.92%)

95(83.3%) of the students scored at least 60% correct on the assessment.

**Results:** Criteria for Success Achievement Status: Met

**Analysis of Findings:** From the data, these questions had a low correctness (less than 50%). This includes:

Question #16(Atomic Structure and EM Radiation) 46.09% correct

Question #23(Stoichiometry) 33.04% correct

There was a improvement in Questions #4, 6, and 24. In the Fall of 2013, these three questions had lower than 50% correct responses.

**Recommendations:** We will continue to use the same assessment tool in Fall 2015. To get a better understanding of the students' "disconnect" and analysis must be made of what the students answered incorrectly with.

## Outcome 2

Perform experiments with given directions and collect valid scientific data.

### ▼ Measure: Chem 209 SLO 2 (Lab) Course level; Direct - Other

**Description of Measurement Tool:** As a method of assessment, we used laboratory reports as a way to assess both B and C in SLOs. A full laboratory report of Experiment #9 (Stoichiometry) will be used to assess these SLOs. A rubric will be used to standardize grading of the lab report and help identify the features we are looking for in students' performance. The students are asked to perform the gravimetric analysis experiment over a laboratory period. Directions to perform the experiment are given in the laboratory manual. The students will be evaluated on their ability to follow procedure, collect their data and perform the necessary calculations. Success is achieved when at least 70% of the students score earn a developing or accomplished score on the lab report.

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**Cycle of Assessment:** The SLO is assessed every Fall semester.

**Who is Responsible for Assessment Activity?:** The instructor of record is responsible for administering the assessment. The Lead instructor for the course is responsible for compiling the data and sharing results with the department. The Lead instructor for Chem 209 in Fall 2014 was Jeffrey Wada

### Findings for Chem 209 SLO 2 (Lab)

**Summary of Findings:** Number of students assessed: 72  
Number of sections: 3

72(100%) of the students earned developing or accomplished correct on the assessment.

**Results:** Criteria for Success Achievement Status: Met

**Analysis of Findings:** The lowest scoring portion of the assessment are the questions (#2 & #3). Students were quite strong in presenting data and calculations. Students tend to be able to successful if there is a procedure towards solving a problem. But when it comes to open ended questions (#2 & #3), they seem to be less successful. These type of questions require the students to be able predict("visualize") what would happen if a change occurs in the procedure.

**Recommendations:** We will continue using this assessment for SLOs 2 & 3.

#### Substantiating Evidence:

 209SLOEXPTF2014.xlsx (Excel Workbook (Open XML)) (See appendix)

### ▼ Measure: Chem 209 SLO 2 (Lab) Course level; Direct - Other

**Description of Measurement Tool:** As a method of assessment, we used laboratory reports as a way to assess both B and C in SLOs. A full laboratory report of Experiment #9 (Stoichiometry) will be used to assess these SLOs. A rubric will be used to standardize grading of the lab report and

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**Recommendations:** We will continue using this assessment for SLOs 2 & 3

**Substantiating Evidence:**

 209SLOEXPTF2014.xlsx (Excel Workbook (Open XML)) (See appendix)

## Overall Recommendations

*No text specified*

 Plans of Action

 Status Reports



## 2013-2014 Assessment Cycle

### Measurements

#### Outcomes and Measures

### CHEM 209 Introductory Chemistry Outcome Set

#### Outcome

##### Outcome 1

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Course level; Direct - Exam

**Description of Measurement Tool:** We used a common final exam as 25 multiple choice questions to give to all four sections assessed. The exam had some concept questions and some calculation based problems.

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##### Outcome 2

Perform experiments with given directions and collect valid scientific data.

▼ **Measure:** Chem 209 SLO 2 (Lab)  
Course level; Direct - Other


**Description of Measurement Tool:** As a method of assessment, we used laboratory reports as a way to assess both B and C in SLOs. A full laboratory report of Experiment #9 (Stoichiometry) will be used to assess these SLOs. A rubric will be used to standardize grading of the lab report and help identify the features we are looking for in students' performance. The students are asked to perform the gravimetric analysis experiment over a laboratory period. Directions to perform the experiment are given in the laboratory manual. The students will be evaluated on their ability to follow procedure, collect their data and perform the necessary calculations. Success is achieved when at least 70% of the students score earn a developing or accomplished score on the lab report.

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**Supporting Attachments:**

 SLO 2 Chem 209 Findings (Adobe Acrobat Document) (See appendix)

## Findings

### Finding per Measure

## CHEM 209 Introductory Chemistry Outcome Set

### Outcome

#### Outcome 1

Describe chemical events through utilization of equations and solve problems using chemical concepts.

#### ▼ Measure: Chem 209 SLO 1 (Lecture) Course level; Direct - Exam

**Description of Measurement Tool:** We used a common final exam as 25 multiple choice questions to give to all four sections assessed. The exam had some concept questions and some calculation based problems.

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#### Findings for Chem 209 SLO 1 (Lecture)

**Summary of Findings:** Number of students assessed: 107

Number of sections: 4

Average correct answers for each section: 16.8(67.1%), 17.6(70.1%), 18.6(75.1), 19.3(77.3%)

Average answers for all sections combined: 17.9(71.4%)

77(72.0%) of the students scored at least 60% correct on the assessment.

**Results:** Criteria for Success Achievement Status: Met

**Analysis of Findings:** From the data, these questions had a low correctness (less than 50%). This includes:

Question #4(Periodic Trend:atomic radii)41.1% correct

Question #6(Reaction:Balancing)45.8% correct

Question #23(Stoichiometry)33.6% correct

Question #24(Bonding:VSEPR)41.4% correct

**Recommendations:** We will continue to use the same assessment tool in Fall 2014.

To get a better understanding of the students' "disconnect" and analysis must be made of what the students answered incorrectly with.

#### Outcome 2

Perform experiments with given directions and collect valid scientific data.

#### ▼ Measure: Chem 209 SLO 2 (Lab) Course level; Direct - Other

**Description of Measurement Tool:** As a method of assessment, we used laboratory reports as a way to assess both B and C in SLOs. A full laboratory report of Experiment #9 (Stoichiometry) will be used to assess these SLOs. A rubric will be used to standardize grading of the lab report and help identify the features we are looking for in students' performance. The students are asked to perform the gravimetric analysis experiment over a laboratory period. Directions to perform the experiment are given in the laboratory manual. The students will be evaluated on their ability to follow procedure, collect their data and perform the necessary calculations. Success is achieved when at least 70% of the students score earn a developing or accomplished score on the lab report.


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**Who is Responsible for Assessment Activity?:** The instructor of record is responsible for administering the assessment. The Lead instructor for the course is responsible for compiling the data and sharing results with the department. The Lead instructor for Chem 209 in Fall 2013 was Jeffrey Wada

**Supporting Attachments:**

 SLO 2 Chem 209 Findings (Adobe Acrobat Document) (See appendix)

### Findings for Chem 209 SLO 2 (Lab)

**Summary of Findings:** Number of students assessed: 114  
Number of sections: 5

113(99.1%) of the students earned developing or accomplished correct on the assessment.

Refer to attachment

**Results:** Criteria for Success Achievement Status: Met

**Analysis of Findings:** The lowest scoring portion of the assessment are the questions (#2 & #3). Students were quite strong in presenting data and calculations. Students tend to be able to successful if there is a procedure towards solving a problem. But when it comes to open ended questions (#2 & #3), they seem to be less successful. These type of questions require the students to be able predict("visualize") what would happen if a change occurs in the procedure.

**Recommendations:** We will continue using this assessment for SLOs 2 & 3.

## Overall Recommendations

*No text specified*

 **Plans of Action**

 **Status Reports**

## 2012-2013 Assessment Cycle

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 **Measurements**

 **Findings**

 **Plans of Action**

 **Status Reports**

# Appendix

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- A. **209SLOEXPTF2014.xlsx** (Excel Workbook (Open XML))
  - B. **209SLOEXPTF2014.xlsx** (Excel Workbook (Open XML))
  - C. **SLO 2 Chem 209 Findings** (Adobe Acrobat Document)
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