

# **Course Student Learning Outcomes Assessment**

**ASTR 109 Introduction to the Solar System**

**Created on: 09/11/2013 01:16:00 PM PST  
Last Modified: 06/05/2015 01:16:10 PM PST**

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

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# Standing Requirements

## Course Description

Surveys history of astronomy recent research and space flight observations of the planets moons and other solar system objects. Explores light and gravity to understand formation properties and motion of Solar System objects.

## Course Student Learning Outcomes

### ASTR 109 Introduction to the Solar System Outcome Set

Outcome	
Outcome	Mapping
Outcome 1 Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations.	<b>Institutional Student Learning Outcomes:</b> Act 3, Communicate 1, Learn 3, Think 1, Think 3
Outcome 2 Demonstrate an understanding that science is based upon observations of the universe and how that is used to understand some basic phenomenon of our world.	<b>Institutional Student Learning Outcomes:</b> Act 3, Communicate 1, Think 1
Outcome 3 Discuss how gravity is related to the formation, interaction, and evolution of the solar system.	<b>Institutional Student Learning Outcomes:</b> Communicate 1, Think 1

# 2014-2015 Assessment Cycle

## Measurements

### Outcomes and Measures

#### Outcome

##### Outcome 1

Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations.

▼ **Measure:** Astr 109 SLO 1 Embedded Final Exam Questions  
Course level; Direct - Exam

**Description of Measurement Tool:** The assessment tool consisted of a series of multiple-choice questions, embedded into the final exams of the sections taught in the Fall 2014 term. The questions were selected by the instructor of record for the section and based on the ability to interpret data to determine a conclusion.

**Criteria for Success: Individual & Collective Student Criterion:** If 60% the students taking the final exam collectively answered the questions correctly the SLO is considered to be met.

**Cycle of Assessment:** Data gathered Fall 2014, analyzed and reported Spring 2015.

The Department adopted cycle for ongoing assessment is:

Data gathered: Fall semester: 2017, 2020, 2023, 2026, 2029

Data analyzed: Winter Intersession: 2018, 2021, 2024, 2027, 2030

Results reported: Spring semester 2018, 2021, 2024, 2027, 2030

**Who is Responsible for Assessment Activity?:** The instructor of record for the sections was responsible for administering the assessment and collection of data. Fall 2014 assessment data was coordinated, analyzed, and reported by Professor Martino.

##### Outcome 2

Demonstrate an understanding that science is based upon observations of the universe and how that is used to understand some basic phenomenon of our world.

*No measures specified*

##### Outcome 3

Discuss how gravity is related to the formation, interaction, and evolution of the solar system.

*No measures specified*

## Findings

### Finding per Measure

#### Outcome

**Outcome 1**

Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations.

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Results reported: Spring semester 2018, 2021, 2024, 2027, 2030

**Who is Responsible for Assessment Activity?:** The instructor of record for the sections was responsible for administering the assessment and collection of data. Fall 2014 assessment data was coordinated, analyzed, and reported by Professor Martino.

**Findings** for Astr 109 SLO 1 Embedded Final Exam Questions

**Summary of Findings:** The analysis included 4 sections of Astr 109, having a total of 170 students taking the final exams and thus being surveyed for the SLO. Two of the sections had a survey of 44 questions, two sections consisted of 14 questions used for the assessment.

The collective average of students, over all four sections, correctly answering the SLO questions is 66.7%.

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

**Analysis of Findings:** 2 of the 4 sections had a survey of 44 questions for the SLO. 83 students participated in this survey. This subset had an overall success rate of 63.8%. Of the 44 questions, there were 7 where more than 50% of students failed to correctly answer the question.

The other 2 sections had a survey of 14 questions and had 87 students in the assessment. This subset had an overall success rate of 69.6%. There was only 1 question in this tool that had more than half of the students incorrectly answer.

There is a 6.1% difference in success rates between the 2 subset of students. This is a relatively close discrepancy. The difference in the number of questions on the assessment, and number of questions where more than half the students missed the questions is to be considered in this difference.

**Recommendations:** The faculty are encouraged to continue with teaching styles that have historically lead to successful outcomes. They are encouraged to review the SLO questions they use in their assessment tools and to further exchange questions for more uniformity in their assessment. The faculty are encouraged to determine an appropriate number of questions for the assessment and consider using a more similar number of questions in the surveys used in each section.

**Outcome 2**

Demonstrate an understanding that science is based upon observations of the universe and how that is used to understand some basic phenomenon of our world.

*No measures specified*

**Outcome 3**

Discuss how gravity is related to the formation, interaction, and evolution of the solar system.

*No measures specified*

## Overall Recommendations

*No text specified*

### Plans of Action

### Status Reports

## 2013-2014 Assessment Cycle

### Measurements

#### Outcomes and Measures

#### Outcome

##### Outcome 1

Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations.

▼ **Measure:** Astr 109 SLO 1 Embedded Final Exam Questions  
Course level; Direct - Exam

**Description of Measurement Tool:** Assessment consisted of 6 multiple-choice questions embedded into a cumulative final.

**Criteria for Success: Individual & Collective Student Criterion:** The criterion for successfully meeting the SLO is a collective 60% of the students taking the assessment correctly answering the questions.

**Cycle of Assessment:** Data gathered Spring 2013, analyzed and reported Fall 2013

New adopted Cycle for ongoing assessment:

Data gathered: Fall semester 2014, 2017, 2020, 2023, 2026, 2029

Data analyzed: Winter break 2015, 2018, 2021, 2024, 2027, 2030

Results reported: Spring semester 2015, 2018, 2021, 2024, 2027, 2030

**Who is Responsible for Assessment Activity?:** The instructor of record for the sections was responsible for administering the assessment and collection of data. Spring 2013 assessment was coordinated, analyzed, and reported by Professor Barembaum.

##### Outcome 2

Demonstrate an understanding that science is based upon observations of the universe and how that is used to understand some basic phenomenon of our world.

▼ **Measure:** Astr 109 SLO 2 Embedded Final Exam Questions  
Course level; Direct - Exam

**Description of Measurement Tool:** Assessment consisted of 7 multiple-choice questions embedded into a cumulative final.

**Criteria for Success: Individual & Collective Student Criterion:** The criterion for successfully meeting the SLO is a collective 60% of the students taking the assessment correctly answering the questions.

**Cycle of Assessment:** Data gathered Spring 2013, analyzed and reported Fall 2013

New adopted Cycle for ongoing assessment:

Data gathered: Fall semester 2015, 2018, 2021, 2024, 2027, 2030

Data analyzed: Winter break 2016, 2019, 2022, 2025, 2028, 2031

Results reported: Spring semester 2016, 2019, 2022, 2025, 2028, 2031

**Who is Responsible for Assessment Activity?:** The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2013 assessment was coordinated, analyzed, and reported by Professor Barembaum.

##### Outcome 3

Discuss how gravity is related to the formation, interaction, and evolution of the solar system.

▼ **Measure:** Astr 109 SLO 3 Embedded Final Exam Questions  
Course level; Direct - Exam

**Description of Measurement Tool:** Assessment consisted of 5 multiple-choice questions embedded into a cumulative final.

**Criteria for Success: Individual & Collective Student Criterion:** The criterion for successfully meeting the SLO is a collective 60% of the students taking the assessment correctly answering the questions.



**Cycle of Assessment:** Data gathered Spring 2013, analyzed and reported Fall 2013

New adopted Cycle for ongoing assessment:

Data gathered: Fall semester 2016, 2019, 2022, 2025, 2028, 2031

Data analyzed: Winter break 2017, 2020, 2023, 2026, 2029, 2032

Results reported: Spring semester 2017, 2020, 2023, 2026, 2029, 2032

**Who is Responsible for Assessment Activity?:** The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2013 assessment was coordinated, analyzed, and reported by Professor Barembaum.

## Findings

### Finding per Measure

#### Outcome

##### Outcome 1

Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations.

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**Who is Responsible for Assessment Activity?:** The instructor of record for the sections was responsible for administering the assessment and collection of data. Spring 2013 assessment was coordinated, analyzed, and reported by Professor Barembaum.

#### Findings for Astr 109 SLO 1 Embedded Final Exam Questions

**Summary of Findings:** A total of 178 students from 4 different sections of the course were surveyed. Of the 178 students surveyed for the final exam assessment, 75% of the students correctly answered the questions regarding this SLO. With 75% of the students meeting the SLO, the SLO is considered to be successfully met.

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

**Analysis of Findings:** Of the 6 questions used in the survey, there were no questions that more than 50% of the students missed. With 75% of our students successfully working through the questions, we are confident that our students apply scientific reasoning to future astronomical discoveries to understand their validity.

**Recommendations:** Faculty are encourage to continue to seek ways to improve instruction and assessment, no major correction recommended. The faculty are encouraged to continue instruction with a student-centered format, similar to those techniques was used in the facilitation of the sections surveyed. The faculty are encouraged to review the questions related to the SLO to ensure they are the most appropriate questions for assessing the SLO.

##### Outcome 2

Demonstrate an understanding that science is based upon observations

▼ **Measure:** Astr 109 SLO 2 Embedded Final Exam Questions  
Course level; Direct - Exam

of the universe and how that is used to understand some basic phenomenon of our world.

**Description of Measurement Tool:** Assessment consisted of 7 multiple-choice questions embedded into a cumulative final.

**Criteria for Success: Individual & Collective Student Criterion:** The criterion for successfully meeting the SLO is a collective 60% of the students taking the assessment correctly answering the questions.

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**Who is Responsible for Assessment Activity?:** The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2013 assessment was coordinated, analyzed, and reported by Professor Barembaum.

### Findings for Astr 109 SLO 2 Embedded Final Exam Questions

**Summary of Findings:** A total of 178 students from four different sections of the course were surveyed. Of the 178 students surveyed for the final exam assessment, 64% of the students correctly answered the questions regarding this SLO. With 64% of the students meeting the SLO, the SLO is considered to be successfully met.

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

**Analysis of Findings:** Of the 7 questions used in the survey, there was one question that more than 50% of the students missed. If this question is omitted, the success rate goes up to 66%. With 64% of our students successfully working through the questions, we are confident that our students can demonstrate an understanding that astronomy is based upon observations of the sky and how those observations explain some basic phenomena of nature.

**Recommendations:** Faculty are encourage to continue to seek ways to improve instruction and assessment, no major correction recommended. The faculty are encouraged to continue instruction with a student-centered format, similar to those techniques was used in the facilitation of the sections surveyed. The faculty are encouraged to review the questions related to the SLO to ensure they are the most appropriate questions for assessing the SLO.  
Outcome 3

### Outcome 3

Discuss how gravity is related to the formation, interaction, and evolution of the solar system.

#### ▼ Measure: Astr 109 SLO 3 Embedded Final Exam Questions Course level; Direct - Exam

**Description of Measurement Tool:** Assessment consisted of 5 multiple-choice questions embedded into a cumulative final.

**Criteria for Success: Individual & Collective Student Criterion:** The criterion for successfully meeting the SLO is a collective 60% of the students taking the assessment correctly answering the questions.

**Cycle of Assessment:** Data gathered Spring 2013, analyzed and reported Fall 2013  
New adopted Cycle for ongoing assessment:

Data gathered: Fall semester 2016, 2019, 2022, 2025, 2028, 2031

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### Findings for Astr 109 SLO 3 Embedded Final Exam Questions

**Summary of Findings:** A total of 178 students from four different sections of the course were surveyed. Of the 178 students surveyed for the final exam assessment, 58% of the students correctly answered the questions regarding this SLO. With 58% of the students meeting the SLO, the SLO is considered to be partially met.

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

**Analysis of Findings:** Of the 5 questions used in the survey, there were two questions that more than 50% of the students missed. If these questions are omitted, the success rate goes up to 72%. In examining the two questions that more than 50% of the students missed, it appears wording may be an issue for one. When solely that one question is omitted, the success rate rises to 65%. With 65% of our students successfully working through the questions (except for the one questions with questionable wording), we are confident that our students can explain how gravity is related to the formation, interaction, and evolution of the Solar System.

**Recommendations:** Faculty are encourage to continue to seek ways to improve instruction and assessment, no major correction recommended. The faculty are encouraged to continue instruction with a student-centered format, similar to those techniques was used in the facilitation of the sections surveyed. The faculty are encouraged to review the questions related to the SLO to ensure they are the most appropriate questions for assessing the SLO.

## Overall Recommendations

*No text specified*

### Plans of Action

### Status Reports

## 2012-2013 Assessment Cycle

### Measurements

#### Outcomes and Measures

##### Outcome

##### Outcome 1

Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations.

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##### Outcome 2

Demonstrate an understanding that science is based upon observations of the universe and how that is used to understand some basic phenomenon of our world.

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## Findings

### Finding per Measure

#### Outcome

##### Outcome 1

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##### Outcome 2

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### Outcome 3

Discuss how gravity is related to the formation, interaction, and evolution of the solar system.

#### ▼ Measure: Astr 109 SLO 3 Embedded Final Exam Questions Course level; Direct - Exam

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The faculty are encouraged to review the questions related to the SLO to ensure they are the most appropriate questions for assessing the SLO.

### Overall Recommendations

*No text specified*

### Plans of Action

#### Actions

#### Outcome

##### Outcome 1

Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations.

*No actions specified*

##### Outcome 2

Demonstrate an understanding that science is based upon observations of the universe and how that is used to understand some basic phenomenon of our world.

*No actions specified*

##### Outcome 3

Discuss how gravity is related to the formation, interaction, and evolution of the solar system.

*No actions specified*

 **Status Reports****Action Statuses****Outcome****Outcome 1***No actions specified*

Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations.

**Outcome 2***No actions specified*

Demonstrate an understanding that science is based upon observations of the universe and how that is used to understand some basic phenomenon of our world.

**Outcome 3***No actions specified*

Discuss how gravity is related to the formation, interaction, and evolution of the solar system.

**Status Summary***No text specified***Summary of Next Steps***No text specified*