



**Washtenaw**  
Community College

# General Education Assessment Report

Fall 2021 – Spring/Summer 2023

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# Introduction

At Washtenaw Community College (WCC) our general education outcomes are divided into six categories, and two of these are further divided into two divisions. This report summarizes the results collected across the applicable academic disciplines. Six General Education Areas were identified, and multiple Performance Indicators (PI) were created for these Areas by the college disciplines. Individual course outcomes were then mapped to each PI. Some courses had multiple outcomes mapped to PIs mapped while others had only one. Assessments were developed and executed over two years, between Fall 2021 and Spring/Summer 2023. The results of that assessment are in this report. The General Education Areas are as follows:

- **Writing:** Develop, organize, and express thoughts in writing using Standard English.
- **2<sup>nd</sup> Writing Composition/Communication:** Develop, organize, and express ideas in standard written English or verbal/non-verbal communication.
- **Mathematics:** Understand the applications and perform computations using the concepts of college-level mathematics.
- **Natural Sciences:** Understand the principles and applications of modern science.
- **Arts and Humanities:** Understand concepts related to the nature and variety of the human experience through literature, language, communication, humanities, and the arts.
- **Social and Behavioral Science:** Understand principles and applications of social and behavioral science in exploring the dynamics of human behavior.

The Performance Indicators are as follows:

- Writing
  1. Write a multi-paragraph essay/report that is clear, organized, complete and appropriate for the intended audience.
  2. Respond to an idea in a thorough, logical, and credible manner.
  3. Provide support for statements and/or opinions.
  4. Write with minimal grammatical or mechanical errors.
- 2<sup>nd</sup> Writing Composition/Communication
  - Communication:
    1. Prepare and deliver a researched, organized, and purposeful speech.
    2. Speak clearly, succinctly, and appropriately before an audience.

3. Demonstrate critical and comprehensive listening through evaluating messages conveyed by others.
- 2<sup>nd</sup> Writing Composition:
    1. Write a competent academic argumentative essay.
    2. Demonstrate critical thinking skills applied to writing.
  - Mathematics
    1. Interpret and draw inferences from mathematical models such as formulas, graphs, tables and/or schematics.
    2. Represent mathematical information symbolically, visually, numerically and/or verbally.
    3. Employ quantitative methods such as arithmetic, algebra, geometry or statistics to solve problems.
    4. Estimate and check mathematical results for reasonableness.
  - Natural Sciences
    1. Recognize the principal concepts within a natural science discipline.
    2. Use the scientific method to propose and test hypotheses through the interpretation of experimental data.
    3. Apply the concepts of a natural science to interpret observations and make inferences based on experimental results.
    4. Recognize the impact and importance of sustainability in a field of science.
  - Arts and Humanities
    1. Recognize distinctive cultural perspectives and human experiences through the study of language, arts, works, and texts.
    2. Identify the origin, context and value of works as they relate to their respective cultures.
    3. Identify the work presented and the method, technique or concept utilized in the work.
    4. Interpret and apply linguistic structures, idiomatic tools, and cultural cues for effective communication.
    5. Communicate effectively using verbal and nonverbal discourse adapted for diverse audiences and purposes.
  - Social and Behavioral Science
    - Behavioral Science:
      1. Recognize and apply psychological and sociological perspectives to the understanding of human behavior.
      2. Distinguish between non-scientific approaches to attaining knowledge (anecdotal, evidence, rumors and common sense) as compared with scientific approaches (theory-driven methods based on empirically based data).

3. Recognize that human behavior is a function of the dynamic interplay of factors at both the micro and macro level.
- Social Science:
    1. Recognize the forms, functions and purposes of government.
    2. Recognize the differences between peoples and cultures in past environments, and how and why those cultures changed over time.

# HUMANITIES, SOCIAL AND BEHAVIORAL SCIENCES (HSS) DIVISION

## **Population, Sample and Data Collection**

The HSS division consists of the Behavioral Sciences department, the Communication, Media and Theatre department, the English department, the Humanities department and the Social Sciences department. **19 courses** in these five departments were assessed between Fall 2021 and Spring/Summer 2023, and so were selected for general education assessment.

In most departments, the number of students assessed for a given SLO differed from the department total. In those cases, the assessed number was marked with an asterisk (\*).

# Behavioral Sciences

## Behavioral Science Performance Indicators

1. Recognize and apply psychological and sociological perspectives to the understanding of human behavior.
2. Distinguish between non-scientific approaches to attaining knowledge (anecdotal, evidence, rumors and common sense), pseudoscientific (grandiose claims consisting of flawed methodology, logical fallacies and invalid logic) as compared with scientific approaches (theory-driven methods based on empirically based data).
3. Recognize that human behavior is a function of intersectionality at both the micro and macro level.

Six courses (6) in the behavioral sciences department, consisting of 51 sections, were used for this assessment report. The total population of students enrolled when the courses were assessed is 1373 of which 901\* students were assessed. A variety of assessment tools were used for the CARs. The assessment tools used for the CARs ranged from a department exam to an assignment.

Course	Performance Indicators	Number of Students Assessed	Number of Sections Assessed	Data Collection Semester(s)
PSY 100: Introduction to Psychology	1, 2, 3	601	33	Fall 22
PSY 150: Psychology of Work	1, 2, 3	50	1	Fall 20/Winter 21
PSY 200: Child Psychology	1, 2, 3	24	1	Fall 21
PSY 220: Human Development	1	49	2	Winter 23
PSY 251: Education of the Exceptional Child	1	49	2	Winter 21
SOC 100: Principles of Sociology	1, 2, 3	132	12	Winter 23
		<b>901</b>	51	

	<b>Assessment Tools</b>
PSY 100	Departmental Exam: The tool was a 50-question multiple-choice test. 10 questions were identified to assess outcome.
PSY 150	Comprehensive paper on an organization. Departmental Exam
PSY 200	Multiple-choice test
PSY 220	2 essay questions
PSY 251	Test questions
SOC 100	Cooley's Looking Glass Assignment

**P.I. 1: Recognize and apply psychological and sociological perspectives to the understanding of human behavior.**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
PSY 100	1-3	70% of students will score at 70% or higher on the assessment	Yes	80%
PSY 150	1,2		Yes	78%
PSY 200	1-3		Yes	71%
PSY 220	1-3		Yes	95%
PSY 251	1-2		Yes	<b>93%</b>
SOC 100	1,2		Yes	76%

All six courses had SLOs aligned with P.I.1 and had a standard of success of 70% of students scoring 70% or higher on the assessment instrument. The standard of success was met with at least 70% of students demonstrating an understanding of human behavior through recognition and/or the application of psychological or sociological perspectives. Of the students assessed, 74% (661/896\*) students passed at the 70% threshold or beyond. Three of the courses assessed were beyond 80% with PSY 220 scoring the highest with 95%.

**P.I. 2: Distinguish between non-scientific approaches to attaining knowledge (anecdotal, evidence, rumors and common sense), pseudoscientific (grandiose claims consisting of flawed methodology, logical fallacies and invalid logic) as compared with scientific approaches (theory-driven methods based on empirically based data).**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
PSY 100	1-3	70% of students will score at 70% or higher on the assessment	Yes	80%
PSY 150	1, 2		Yes	92%
PSY 200	1-3		Yes	71%
SOC 100	4		Yes	89%

Four courses had SLOs aligned with P.I.2 and had a standard of success of 70% of students scoring 70% or higher on the assessment instrument. The standard of success was met with at least 70% of students being able to distinguish non-scientific approaches, pseudoscientific approaches and scientific approaches. Of the students assessed, 74% (594/807\*) of students in the 4 courses assessed passed at the 70% threshold of success or beyond. Three of the courses assessed scored beyond 80% with PSY 150 scoring the highest with 92%.



**P.I. 3: Recognize that human behavior is a function of intersectionality at both the micro and macro level.**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
PSY 100	1-3	70% of students will score at 70% or higher on the assessment	Yes	80%
PSY 150	1,2		Yes	92%
PSY 200	1-3		Yes	71%
SOC 100	3		Yes	89%

Four courses had SLOs aligned with P.I.2 and had a standard of success of 70% of students scoring 70% or higher on the assessment instrument. The standard of success was met with at least 70% of students being able to recognize that human behavior is a function of intersectionality at both the micro and macro level. Of the students assessed, 74% (594/807\*) of students in the 4 courses assessed passed at the 70% threshold of success or beyond. Three of the courses assessed beyond 80% with PSY 150 scoring the highest with 92%.

The behavioral sciences department met the standard of success for all 3 performance indicators based on the submitted CARs with an average of 82%, 83% and 83% respectively.

# Communication, Media & Theatre

## Communication, Media & Theatre Performance Indicators

2. Identify the origin, context and value of works as they relate to their respective cultures.
5. Communicate effectively using verbal and nonverbal discourse adapted for diverse audiences and purposes.

Three courses in the Communication, Media and Theatre department, consisting of 37 sections were used for this assessment report. The total population of students enrolled when the courses were assessed was 637 of which 188 students were assessed. The department has 5 performance indicators however, only 2 of the P.I.s aligned with the course SLOs assessed in this report.

A variety of assessment tools were used for the CARs. The assessment tools used for the CARs ranged from an activity to a performance.

Course	Performance Indicators	Number of Students Assessed	Number of Sections Assessed	Data Collection Semester(s)
COM 101: Fundamentals of Speaking	5	128	30*	Winter 23
COM 130: Into to Mass Communication	2 & 5	48	6	Fall 21 & Winter 22
COM 142: Oral Interpretation of Literature	55	12	1	Winter 22
		<b>188</b>	<b>37</b>	

	<b>Assessment Tools</b>
COM 101	Speech preparation paperwork & Department developed COM 100 activity form
COM 130	COM 130 Media Analysis Rubric
COM 142	Interpretation-of-literature performance.

**P.I. 2: Identify the origin, context and value of works as they relate to their respective cultures.**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
COM 130	1,3	70% of students will score at 70% or higher on the assessment	Yes	94%

Only one course had SLOs aligned with P.I.2. The standard of success was met with at least 70% of students in COM 130 being able to identify the origin, context and value of works as they relate to their respective cultures.

**P.I.5: Communicate effectively using verbal and nonverbal discourse adapted for diverse audiences and purposes.**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
COM 101	1-2	70% of students will score at 70% or higher on the assessment	Yes	85%
COM 130	3		Yes	100%
COM 142	3		Yes	100%

Three courses had SLOs aligned with P.I. 5. The standard of success was met with at least 70% of students in all courses assessed with both COM 130 and COM 142 exceeding the standard at 100%. Students were able to successfully communicate effectively using verbal and non-verbal discourse adapted for diverse audiences and purposes.

Overall, the Communication, Media and Theatre department met the standard of success for performance indicators 2 and 5 based on the submitted CARs with 94% and an average of 95% respectively.

# English

## English Performance Indicators

1. Write a multi-paragraph essay/report that is clear, organized, complete and appropriate for the intended audience.
2. Respond to an idea in a thorough, logical, and credible manner.
3. Provide support for statements and/or opinions.
4. Write with minimal grammatical or mechanical errors.

Only one course was identified as a general education course. The department originally set out to collect data by randomly selecting 100 student capstone essays from the 72 sections offered Winter 22. However, the CAR reviewer noted that fewer than 100 essays were randomly selected (51 total) due to the limitations on the number of faculty who could be credited for contractual assessment work winter 22.

Course	Performance Indicators	Number of Students Assessed	Number of Sections Assessed	Data Collection Semester(s)
ENG 111: Composition I	1-4	51	72	Winter 22

<b>Assessment Tools</b>	
ENG 111	Capstone essay

**P.I.1: Write a multi-paragraph essay/report that is clear, organized, complete and appropriate for the intended audience.**

Courses Assessed	Student Learning Outcome (SLO)	Standard of Success	Met Standard of Success	%
ENG 111	1-3	70% of the students will score 73% or better	Yes	82%

The standard of success was met with 82% scoring 73% or better on the capstone essay; students were able to write a multi-paragraph essay/report that is clear, organized, complete and appropriate for the intended audience.

**P.I.2: Respond to an idea in a thorough, logical, and credible manner.**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
ENG 111	1-3	70% of the students will score 73% or better	Yes	82%

The standard of success was met with 82% scoring 73% or better on the capstone essay; students were able to respond to an idea in a thorough, logical, and credible manner.

**P.I.3: Provide support for statements and/or opinions.**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
ENG 111	1-3	70% of the students will score 73% or better	Yes	82%

The standard of success was met with 82% scoring 73% or better on the capstone essay; students were able to provide support for statements and/or opinions.

**P.I.4: Write with minimal grammatical or mechanical errors.**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
ENG 111	1-3	70% of the students will score 73% or better	Yes	82%

The standard of success was met with 82% scoring 73% or better on the capstone essay; students were able to write with minimal grammatical or mechanical errors.

The English department met the standard of success for all 4 performance indicators based on the submitted CAR with an average 82%.

# Humanities, Languages and Arts

## Humanities, Languages and Arts Performance Indicators

3. Identify the work presented and the method, technique or concept utilized in the work.

Four courses in the Humanities, Languages and Arts department, consisting of 16 sections were used for this assessment report. The total population of students enrolled when the courses were assessed was 358 of which 180 students were assessed. The department has 3 performance indicators however, only 1 of the P.I.s aligned with the 4 courses SLOs assessed in this report.

Course	Performance Indicators	Number of Students Assessed	Number of Sections Assessed	Data Collection Semester(s)
PHL 101: Intro to Philosophy	3	132	13*	Fall 22
PHL 200: Existentialism	3	11*	1	Winter 21
PHL 205: Ethics	3	20	1	Winter 22
PHL 250: Logic	3	18	1	Fall 21
		<b>180</b>	<b>16</b>	

	<b>Assessment Tools</b>
PHL 101	Departmentally designed instrument
PHL 200	Departmentally-designed rubric with a scale of 0-3 and essay exam
PHL 205	Multiple-choice quiz & essay question
PHL 250:	Department exam

**P.I.3: Identify the work presented and the method, technique or concept utilized in the work.**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
PHL 101	1,2	70% of students will score at 70% or higher on the assessment	Yes	82%*
PHL 200	1,2		Yes	82%*
PHL 205	1-3		Yes	83%*
PHL 250	1-3		Yes	94%*

All four courses met the standard of success for P.I. 3, with an average of 85% of students being able to identify the work presented and the method, technique or concept utilized in the work.

The Humanities, Language and Arts department met the standard of success for P.I. 3. based on the submitted CARs with an average 85%.



# Social Sciences

## Social Science Performance Indicators

1. Recognize the forms, functions, and purposes of government.
2. Recognize the differences between peoples and cultures, and identify how, and why, those peoples and cultures have changed over time.

Course	Performance Indicators	Number of Students Assessed	Number of Sections Assessed	Data Collection Semester(s)
ANT 205: Intro to Archaeology	1, 2	83	7	Fall 21, Winter 21 & 22 SP/SU 21 & 22
ECO 110: Intro to Economics	1	35	2	Winter 23
ECO 211: Principles of Economics I	1	148	8	Winter 23
PLS 112: Intro to American Government	1	207	10	Fall 22 & Winter 23
PLS 241: Guns, God and Ganja: U.S. Federalism	1	10	1	Winter 21
		<b>483</b>	<b>28</b>	

	<b>Assessment Tools</b>
ANT 205	Department exam: 5 multiple choice questions from Exam 1 & 2.
ECO 110	Outcome-related exam questions
ECO 211	Departmentally-developed questions embedded in course exams
PLS 112	Department exam
PLS 241	Department exam

**P.I. 1: Recognize the forms, functions, and purposes of government.**

Courses Assessed	Student Learning Outcome (SLO)	Standard of Success	Met Standard of Success	%
ANT 205	2,3	70% of students will score at 70% or higher on the assessment	No	53%
ECO 110	1-3		NO	58%
ECO 211	1-4		NO	56%
PLS 112	1-5		YES	85%
PLS 241	1-4		YES	80%**

The department did not meet the standard of success with 2 out of 5 (40%) courses meeting the standard for P.I.1. An average of 63% of the students assessed in all 4 courses were able to recognize the forms, functions, and purposes of government.

**ANT 205:** SLO 2 and 3 were mapped to align with P.I. 1. The CAR reviewer noted that of the five questions used to measure SLO 2, only two had average scores (across all semesters) greater than a 75% success rate, which is higher than the 70% department standard. For SLO 3, the results for this learning outcome did not meet expectations. The course assessment review noted in only one semester (Winter 2022) did students meet or exceed the success rate. In all other semesters, the success rate was well below the threshold for success. The average success rate across all semesters was only 67.6%. Based on the CAR, only 40% met the standard of success for SLO 2 and 67% for SLO 3 for an average of 53% for P.I. 1.

**ECO 110** had all 3 SLO aligned with P.I. 1, 2 out of 3 did not meet the standard of success. SLO 1 did meet the standard of success at 83% however, SLO 2 and 3 scored below the standard of success at 49% and 43% respectively. As a result, this course did not meet the standard of success with an average of 58% or 20 out of 42 students.

**ECO 211** had 4 SLOs aligned with P.I. 1, all 4 did not meet the standard of success. The CAR reviewer noted Additional emphasis would be given to the role of capital goods in economic growth and the effects of specialization of inputs on opportunity cost SLO 1. For SLO 2, the CAR reviewer noted that more emphasis needs to be given to understanding when a price floor or ceiling is binding in these sections, and which groups benefit and lose when price ceilings and floors are enacted. More practice problems and homework on these topics are likely warranted. For SLO 3, In most sections, students struggled to calculate the real rate

of interest. There were sporadic difficulties across sections interpreting the concept of disinflation. The CAR reviewer noted that both of these areas will require additional emphasis and additional homework on these topics were likely warranted.

\*\*Overall **PLS 241** met the standard of success with 3 of 4 SLOs aligned with P.I.1. SLO 3 did not meet the standard of success. The CAR reviewer noted more time would be spent on Article IV of the U.S. Constitution.

**P.I. 2: Recognize the differences between peoples and cultures, and identify how, and why, those peoples and cultures have changed over time.**

<b>Courses Assessed</b>	<b>Student Learning Outcome (SLO)</b>	<b>Standard of Success</b>	<b>Met Standard of Success</b>	<b>%</b>
ANT 205	1-3	70% of students will score at 70% or higher on the assessment	No	53%

The department did not meet the standard of success for P.I. 2. Students were unable to recognize the differences between peoples and cultures, and identify how, and why, those peoples and cultures have changed over time.

**ANT 205:** SLO 1-3 were mapped to align with P.I. 2 with students not meeting the standard of success for SLO 2 and 3. For SLO 1, students exceeded the standard with 83% or 69/83 students scoring 9.375 or higher on the essay. Given that SLO 2 and 3 were aligned with P.I.2, as noted with in P.I.1, the CAR reviewer noted that of the five questions used to measure SLO 2, only two had average scores (across all semesters) greater than a 75% success rate, which is higher than the 70% department standard. For SLO 3, the results for this learning outcome did not meet expectations.

Reviewer noted: "The large number of quizzes and exams in the course emphasizes test-taking over comprehension. Reducing the number of quizzes (and/or exams), and replacing them with self-paced activities such as the exercises from Thinking Strings: Revealing Archaeology might help to refocus student attention on comprehension and not just memorization."

**Conclusion**

Overall the HSS division met the standard of success in 16 of 19 courses, consisting of 187 out of 204 sections assessed between Winter 2021 and Winter 2023.

# MATH, SCIENCE, AND ENGINEERING TECHNOLOGY (MSE) DIVISION

## **Population, Sample and Data Collection**

The MSE division consists of the Chemistry, Life Sciences, Math & Engineering Studies, and Physical Sciences departments. **13 courses** in these four departments were assessed between Fall 2021 and Spring/Summer 2023, and so were selected for general education assessment.

# Mathematics

## Mathematics Performance Indicators

1. Interpret and draw inferences from mathematical models such as formulas, graphs, tables, and/or schematics.
2. Represent mathematical information symbolically, visually, numerically, and/or verbally.
3. Employ quantitative methods such as arithmetic, algebra, geometry, or statistics to solve problems.

## Courses Assessed

Course	Performance Indicator
MTH 160 Basic Statistics	1, 2, 3
MTH 176 College Algebra	1, 2, 3
MTH 192 Calculus II	1, 2, 3

## Population & Sampling

The population for Mathematics general education assessment is all students in the following courses:

MTH 125 Everyday College Math

MTH 160 Basic Statistics

MTH 176 College Algebra

MTH 178 General Trigonometry

MTH 180 Precalculus

MTH 191 Calculus I

MTH 192 Calculus II

MTH 197 Linear Algebra

MTH 293 Calculus III

MTH 295 Differential Equations

A stratified sample, consisting of the courses MTH 160 (Basic Statistics), MTH 176 (College Algebra), and MTH 192 (Calculus II) was chosen. MTH 160 is the terminal course for non-STEM track students as well as students in the nursing program. This class fulfills the General Education math requirement (MTH 125 being the second such class recently assessed in previous reports). MTH 176 is the first STEM-track class that transfers with the Michigan Transfer Agreement. Both MTH 160 and 175 have a large number of sections. MTH 192 is representative of the mid- to upper-level courses offered at WCC. These 3 courses give a representative sample of the population.

The math department uses common final exams for all course assessments, and these common finals were also used for the general education assessment. All sections of each representative course are given the same final exam.

### **Results and Plan of Action**

The common finals are written with the Student Learning Outcomes measured in generic course assessment for a single class in mind, not with the Outcomes measured by the General Education assessment across multiple classes. Due to this, the standard of “success” for a given outcome/performance indicator is different from class to class.

In MTH 176, problems are graded on a 2 point scale, and the standard of success is that 70% of the students will have an average of 70% or higher on questions related to that performance indicator.

In MTH 192, problems are graded on a 4 point scale, and the standard of success is that 70% of the students will have an average of 70% or higher on questions related to that performance indicator.

In MTH 160, problems are graded as percentages. The standard of success is that 75% of the students will have an average of 70% or higher on questions related to that performance indicator.

## Aggregate Success Rates

Performance Indicator	MTH 160 Basic Statistics	MTH 175 College Algebra	MTH 192 Calculus II
1	90.48%	75%	76.38%
2	87.30%	70%	75.88%
3	90.48%	65%	91.46%

The standards were met for all three courses in all three indicators except for performance indicator 3 in College Algebra. This indicator had several applied (“story”) problems which are traditionally difficult for many algebra students. This class also had the smallest sample size of 20 students and a 2-point grading scale which doesn’t allow for granular assessment of a student’s work.

In MTH 176, the department has shifted to using the open-source homework platform MyOpenMath, which makes it easier to build custom problems for a given course. The MTH 176 faculty are working on building in more applied problems to the homework sets to give the students more practice with this skill.

The math department policy of using the common final as an embedded assessment continues to be a solid plan. The ability to create custom homework problems, rather than relying on a fixed bank from a textbook publisher, will hopefully allow the math department to address our weak points related to the General Education performance indicators.

# Natural Sciences

Natural Sciences Performance Indicators:

1. Recognize the principle concepts within a natural science discipline.
2. Use the scientific method to propose and test hypotheses through the interpretation of experimental data.
3. Apply the concepts of a natural science to interpret observations and make inferences based on experimental results.
4. Recognize the impact and importance of sustainability in a field of science.

## Courses Assessed

Course	Performance Indicator
AST 111 General Astronomy	1
CEM 122 General Chemistry II	1,2
PHY 122 General Physics II	2
Cem 101 Introductory Chemistry	3
ENV 101 Introduction to Environmental Science	4

## Population and Sampling

The population for Natural Science general education assessment is all students in the following courses:

ANT 245 Biological Anthropology	CEM 105 Fundamentals of Chemistry
AST 111 General Astronomy	CEM 111 General Chemistry I
BIO 101 Concepts of Biology	CEM 122 General Chemistry II
BIO 102 Human Biology	CEM 140 Organic Biochemistry
BIO 104 Biology of Exercise	CEM 211 Organic Chemistry I
BIO 107 Introduction to Field Biology	CEM 222 Organic Chemistry II



BIO 109 Essentials of Human Anatomy	ENV 101 Environmental Science I
BIO 110 Introduction to Exercise Science	ENV 105 Introduction to Environment and Society
BIO 111 Anatomy and Physiology—Normal Structure and Function	GLG 100 Introduction to Earth Science
BIO 142 Fundamentals of Nutrition, Exercise and Weight Control	GLG 103 Field Geology
BIO 161 General Biology I Ecology and Evolution	GLG 104 Weather
BIO 162 General Biology II Cells and Molecules	GLG 110 Geology of the National Parks and Monuments
BIO 210 Physiology of Exercise	GLG 114 Physical Geology
BIO 208 Genetics	GLG 125 The Earth Through Time
BIO 212 Pathophysiology: Alterations in Structure and Function	GLG 276 Principles of Geographic Information Systems
BIO 215 Cell and Molecular Biology	PHY 105 Conceptual Physics
BIO 225 Tests and Measurements in Exercise Science	PHY 111 General Physics I
BIO 227 Biology of Animals	PHY 122 General Physics II
BIO 237 Microbiology	PHY 211 Analytical Physics I
CEM 101 Introductory Chemistry	PHY 222 Analytical Physics II

For this assessment, a representative sample of courses were selected from the course assessed table on the previous page. All students in all sections of these courses during the semesters shown below were included in the assessment, except where data were not available (for example, students withdrew from the course and did not participate in the exam, lab, or activity etc.) The table below summarizes the number of students who were assessed by course and the semester that data were collected.

<b>Course</b>	<b>Number of Students Assessed</b>	<b>Data Collection Semester</b>
CEM 122 General Chemistry II	62	Fall 2022
PHY 122 General Physics II	104	Fall 2021
AST 111 General Astronomy	241	Winter 2021
ENV 101 Environmental Science	191	Fall 2022
Cem101 Introductory Chemistry	35	Fall 2022

## Results and Plan of Action

The four Natural Science Performance Indicators (PI) were assessed using embedded assessments from a variety of the natural sciences courses: Astronomy, Chemistry, Physics, and Environmental Science.

The assessment findings are summarized below.

PI	Type of Assessment Used	Standard of Success	Assessment Results	Was Standard of Success Achieved?
1. Recognize the principle concepts within a natural science discipline.	CEM 122 Departmental Final Exam	75% of students will score 70% or higher.	46.8% of students scored 70% or higher.	No
1. Recognize the principle concepts within a natural science discipline.	AST 111 Departmental Exams	75% of students will score at least 70%	<ul style="list-style-type: none"> <li>• 87% of students scored 70% or higher on history of astronomy, celestial cycles, and planets</li> <li>• 84% of students scored 70% or higher questions concerning starlight and stars</li> <li>• 85% of students scored 70% or higher on questions regarding galaxies and cosmology.</li> </ul>	Yes
2. Use the scientific method to propose and test hypotheses through the interpretation of experimental data.	PHY 122 Lab Reports and Lab Quiz	70% of students will score 75% or higher.	89% of students assessed score 75% or higher on the lab quiz and on the lab report.	Yes

2. Use the scientific method to propose and test hypotheses through the interpretation of experimental data.	CEM 122 General Chemistry II	75% of students will score 70% or higher.	84.9% of students scored 70% or higher.	Yes
3. Apply the concepts of a natural science to interpret observations and make inferences based on experimental results.	CEM 101 Introductor y Chemistry	75% of students will score 7 out of 10 (70%) or higher	All students (100%) scored 9 or above	Yes
4. Recognize the impact and importance of sustainability in a field of science.	ENV 101, Departme ntal Exams	70% of students will score 70% or higher.	88% of students scored 70% or higher.	yes

## PI #1

In the last report, it was stated that a broader selection of courses should be used in the future for this PI. As such, we used CEM 122 (General Chemistry II) and PHY 111 in regard to this concern.

For CEM 122: Students unfortunately did not meet the standard of success. Two factors may have led to the standard of success not being met. First, many of our students who fail, or withdraw, from the course do take the final assessment exam on the last day of the class. We encourage these students to take the final exam if they are planning on retaking the course to aid them in their course retake. As such, these students usually score at a much lower percentage compared to the rest of the students. Second, the semester that these data were collected (Fall 2022) was only the second semester in which both the lecture and lab sections were taught on campus. Students that took the first semester course (CEM 111) virtually may have not been as prepared to take CEM 122 as students who had taken CEM 111 on campus. (Anecdotal evidence of virtual students compared to on campus students seem to bear this out). CEM 122 also requires strong algebra skills in order to be successful in this course. Again, students taking their algebra math courses virtually or online may have come in less prepared compared to students who took these math classes in person. At this point, no course changes will be made. However, moving forward since all chemistry courses are now completely back on campus, if students perform poorly in the future, course changes will need to be considered.

For AST 111: Student did meet the standard of success. Exam questions requiring understanding of principles in astronomy history, celestial cycles and planets, starlight, stars, galaxies, and cosmology were used in the assessment. The specific percentages obtained for each are listed in the previous table. The average across all test scores was 85% resulting in greater than 90% of the students scoring above a 70%. It was noted that some students did struggle with math based questions which could still be due to the pandemic. Based on the results, no course change was suggested.

## PI#2

For PHY 122: Lab reports and lab quiz were scored using departmentally developed rubrics. Specific topics were address including electricity, magnetism, and light. 39 out of the 44 students scored 75% or higher on the lab quiz and lab report (89%). On the topic of electricity, 41 out of 44 students met the standard of success (93%); on magnetism, 35 out of 44 students met the standard of success (80%); and on the topic of light, 42 out of 44 students met the standard of success (95%). It was noted that students did especially well in electricity and light labs after analyzing the data by unit. The results of the lab quiz demonstrated that students understood the concepts and were able to apply these to the calculations performed after the lab session was run. In addition, faculty found that some students did have difficulty with the magnetism labs

(such as finding the direction of the magnetic field and force). These topics will be continued to reinforced in the lecture and during the specific lab session. Lastly, as also noted with CEM 122, students did struggle with problems involving math calculations. Due to these results, no course changes were made.

For CEM 122: The standard of success was met for this PI. The lab chosen to assess this PI was toward the end of the semester. As such, students were training and instructed during the entire semester on how to properly write up a lab report—including summarizing the procedure, collecting and recording data, performing the calculations, and correctly summarizing their experimental results.

### PI#3

CEM101: Laboratory reports were used to assess this PI. The lab report is from week ten of the semester, and students are well versed in completing the lab and writing a good lab report. The reports were consistently good throughout all the assessed sections of the course. The reports were assessed for correct format, data collections, results, calculations and writing a conclusion based on the data/ results of the lab experiment. All students scored 9 or higher on a 10-point rubric so the standard was met for this PI.

Only 5 students from each of the assessed sections were used due to time constraints.

### PI#4

For ENV 101: Departmental exams (using short answer and essay questions) were used to assess this PI. Specifically, students needed to recognize and identify environmental issues and concerns, including sustainability. Students did meet the standard of success as 90% of the students (171) scored 70% or higher on the questions concerning the environment and sustainability. One area that students seemed to struggle with specifically was regarding conservation strategies such as wildlife corridors. Future goals of this class include additional work in climate change and biodiversity loss related to sustainability.

## Conclusion

The data collected in this report was collected over the years Fall 2021 – Winter 2023, so some was collected during the pandemic or very shortly thereafter. As shown by the results, student performance is still strong in all areas.

Our assessments use a wide variety of methods that fit the course and PI properly. They range from papers, performances, tests, and laboratory reports and so really reflect the array of courses and the actual general education outcomes we want to offer to students.

Some assessments are embedded into the learning management system (LMS) we use at WCC, while others are paper tests, or in-class activities. The LMS-based assessments are easier to collect in a systematic way so all students in different sections are assessed. When assessment tools are aligned with the PI, it makes the data processing easier as well. Sometimes with the classroom-based activities, not all sections or students are assessed, because the data collection process becomes more difficult. Still, we're seeing this problem less and less.

Overall WCC is doing a good job with general education, and faculty are more on-board with this process. Our students are well prepared to continue on in their education or to graduate their programs.