

LEARNING OUTCOME AND RUBRIC REVISIONS FOR THE GEN ED PROGRAM: NATURAL SCIENTIFIC INQUIRY (NSI)

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on behalf of the GEOC Assessment Subcommittee
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OVERVIEW

- Goals of Gen Ed assessment
- Definitions
- Round 2 assessment process
- Learning outcomes and rubric review
- Rubric pilot with sample assignment(s)
- Instructor responsibilities
- Where to send more feedback or get help

Assessment

To ensure that the General Education Program is meeting its goals and that our students are achieving the learning outcomes set out for the program, the [General Education Oversight Committee \(GEOC\)](#) undertook a [collaborative process](#) to develop an assessment plan for Gen Ed. Assessment is a means for the GEOC, departments, and instructors to evaluate how they are meeting the learning outcomes of the program; it is not an SET (Student Evaluation of Teaching) and cannot be used without the instructor's permission in performance or merit evaluations. Instead, assessment should be a transparent process that [protects individual instructor and student confidentiality](#) while encouraging departments and instructors to strengthen instructional delivery, materials, and assignments, and build on areas of strength. The GEOC will rely heavily on the Continued Improvement phase of assessment. Our goal is to provide the best General Education program we can for our students.

The Gen Ed Assessment Process is led by [General Education Assessment Fellows](#) and the GEOC; however, the success of our

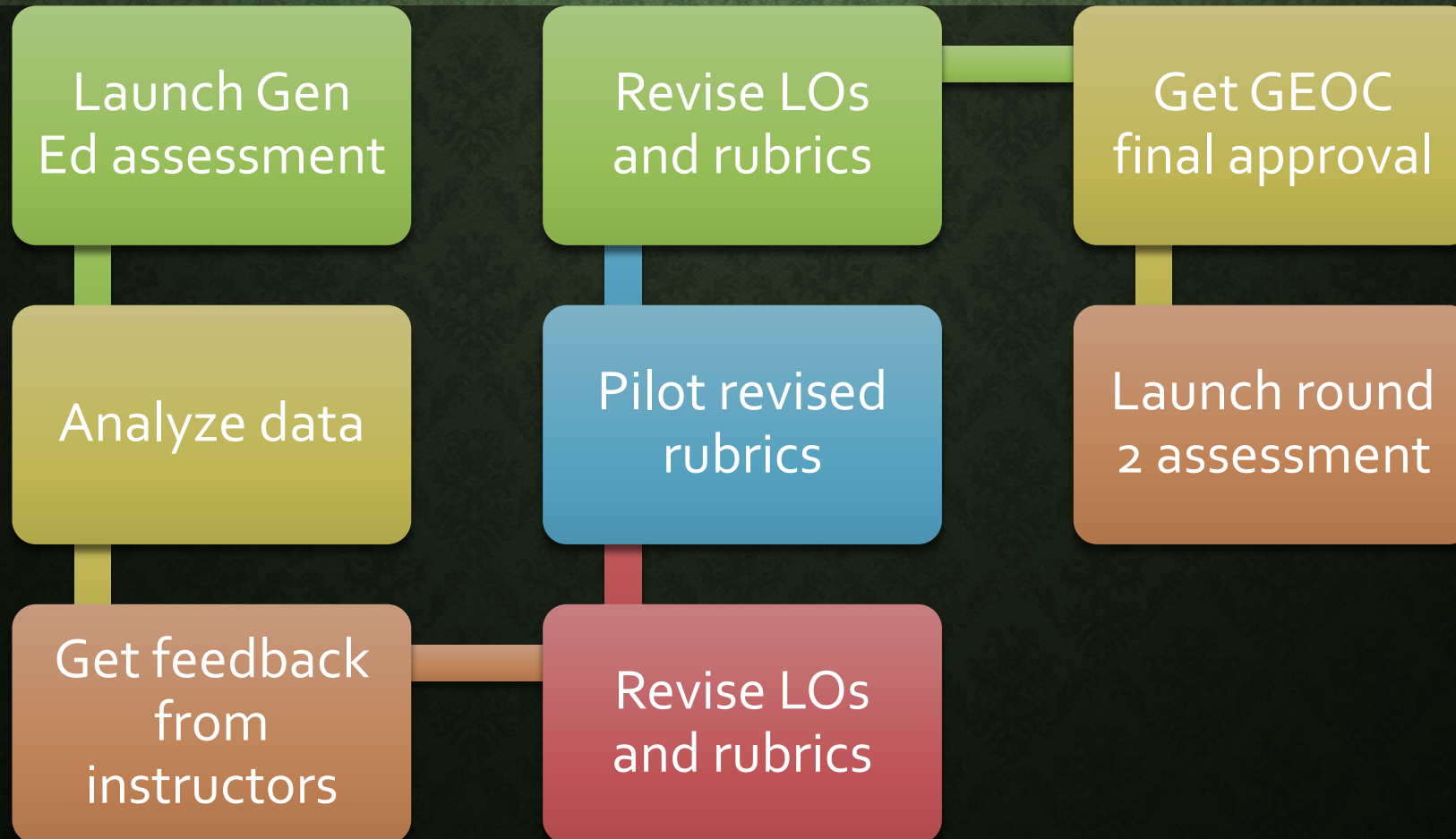
WSU'S GOALS FOR GEN ED ASSESSMENT

See the General Education Oversight Committee's [Gen Ed assessment website](#) for more information.

SOME DEFINITIONS

- **Program assessment** is the process through which program faculty and staff use student performance data, often collected through assignments, to determine whether the program is supporting students in achieving pre-determined learning outcomes.
- **Learning outcomes** are statements that describe what students should know or be able to do at the end of a course or program.
 - Gen Ed outcomes are set by the General Education Oversight Committee (GEOC).
- **Rubrics** are scoring tools that describe different levels of performance on each learning outcome.

GEN ED ASSESSMENT ROUND 2



GEN ED RUBRIC STRUCTURE

Performance Levels

Learning Outcomes

	Exceeds expectations	Meets expectations	Partially meets expectations	Does not meet expectations
LO ₁				
LO ₂				
LO ₃				

Level Descriptors

Levels are implicational

THINGS TO REMEMBER WHEN REVIEWING GEN ED LEARNING OUTCOMES AND RUBRICS

1. Vertical focus: The learning outcomes should be distinct and independent of each other, but typically at a similar level of Bloom's taxonomy.
 - The language must be inclusive of all disciplines in the Gen Ed designation/category.
2. Horizontal focus: The performance levels are implicational (higher levels imply achievement of the lower levels) and should evoke increasingly complex skills as you move from right to left.
3. The rubric doesn't have to *perfectly* match your course – ask yourself whether your course elicits these different learning outcomes at the “Meets expectations” level or higher.
 - The “Meets expectations” level should most closely align with the learning outcome.



Are the learning outcomes independent of each other and at an appropriate level of Bloom's taxonomy?



Do the different performance levels of the rubric appropriately capture progressive levels of student achievement for each learning outcome?



Are the action words used to evoke different skill levels appropriate for that learning outcome?



Does the language seem clear and appropriate? If not, does the glossary clarify any ambiguous meaning?

QUESTIONS FOR LO AND RUBRIC REVIEWS

NSI Learning Outcomes (The student...)	Exceeds expectations	Meets expectations	Partially meets expectations	Does not meet expectations
<i>LO1: Explains natural phenomena using scientific concepts, theories, and/or principles.</i>	Applies scientific concepts, theories, and/or principles to explain natural phenomena.	Correctly describes natural phenomena using scientific concepts, theories, and/or principles.	Identifies natural phenomena.	Unable to identify natural phenomena.
<i>LO2: Describes the process of scientific inquiry.</i>	Articulates how scientific inquiry can be used to make valid inferences about patterns, relationships, or themes involving natural phenomena.	Discriminates between valid and invalid inferences using basic concepts and methods of scientific inquiry.	Identifies basic concepts or methods of scientific inquiry.	Unable to identify or define basic concepts of scientific inquiry.
<i>LO3: Analyzes historical or contemporary societal subjects using scientific concepts and principles.</i>	Applies scientific perspectives to evaluate historical or contemporary societal subjects.	Describes scientific concepts and principles germane to a historical or contemporary societal subject.	Identifies a historical or contemporary societal subject related to scientific concepts and principles.	Unable to identify or describe historical or contemporary societal subjects related to scientific concepts or principles.
<i>LO4: Applies the scientific method to evaluate data.</i>	Interprets the meaning of data collected via the scientific method and articulates its relevance to stated hypotheses.	Describes data collected via the scientific method using scientific theory, concepts, or principles.	Identifies data collected via the scientific method.	Demonstrates little to no ability to recognize data collected with the scientific method.

← Levels are implicational

“Not submitted” column is included in the Canvas rubric.

NSI RUBRIC GLOSSARY

- **Natural phenomena:** Any state or process known through the senses (i.e. observable, measurable) rather than solely by intuition or reasoning.
- **Scientific concepts/theories/principles:** Propositions formulated to explain facts or phenomena in the natural world and confirmed through experiment or observation.
- **Scientific inquiry:** The pursuit of coherent, mechanistic accounts of natural phenomena. Scientific inquiry may or may not follow the strict steps of the scientific method.
- **Societal subject:** Issues and/or events that affect or occur within or among human populations.

APPLYING THE RUBRIC TO SAMPLE ASSIGNMENTS: A REFINEMENT TECHNIQUE

1. **Which learning outcomes** does the sample assignment elicit?
2. Can the assignment elicit performance at **different levels** (Does not meet, Partially meets, Meets, Exceeds expectations) of each learning outcome?
3. Do the **level descriptors effectively differentiate** levels of performance?
4. What changes would you recommend to the:
 - Wording of the learning outcomes?
 - Level descriptors?
 - Assignment design?

AST 2030 - Life in the Universe - Day 19 activity

Work with your group of classmates to answer these questions about global warming and climate change.

The textbook states that the science behind global warming can be summarized with two facts followed by a logical conclusion:

Fact 1: Carbon dioxide and other greenhouse gases trap heat and therefore make Earth warmer than it would be otherwise.

Fact 2: Human activity, especially the use of fossil fuels, has been adding significantly more carbon dioxide and other greenhouse gases to Earth's atmosphere.

Logical conclusion: Given that more greenhouse gas means warmer temperatures and we are adding more greenhouse gases to Earth's atmosphere, we should expect Earth's global average temperature to increase.

1. Summarize the evidence described in the textbook for fact 1.
2. Summarize the evidence described in the textbook for fact 2.
3. Summarize the evidence described in the textbook showing that the logical conclusion is correct and global warming is happening now.
4. Summarize the consequences of global warming that are described in the textbook. What other impacts can you think of?
5. Does the science of global warming satisfy the 3 hallmarks of science described in chapter 2? Why or why not?

SAMPLE ASSIGNMENT

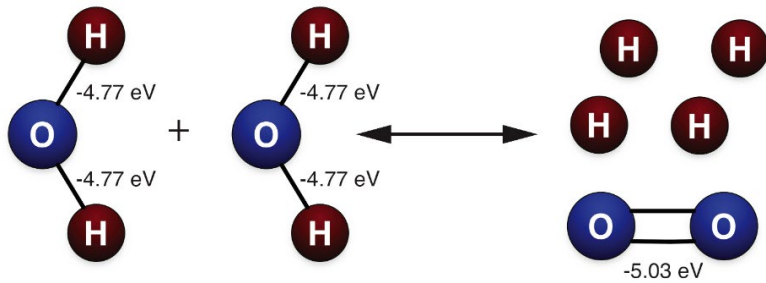
1

1. Which of the NSI learning outcomes does the sample assignment elicit?
2. Can the assignment elicit performance at different levels (does not meet, partially meets, meets, and exceeds expectations)?
3. Do the level descriptors effectively differentiate levels of performance?
4. What changes would you recommend to the (a) wording of the learning outcomes? (b) level descriptors? (c) assignment design?

Energy in Photosynthesis: Light & Dark

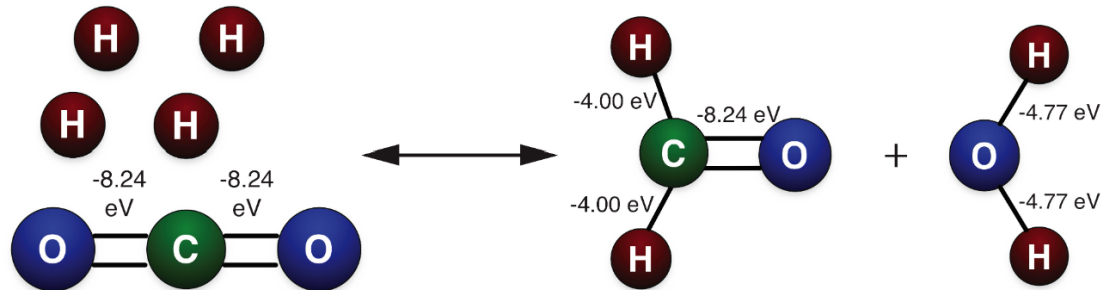
A “toy model” of photosynthesis is the reaction $\text{CO}_2 + 2\text{H}_2\text{O} \leftrightarrow \text{H}_2\text{CO} + \text{H}_2\text{O} + \text{O}_2$ which takes place in two parts. This analysis will help us develop insight into why sunlight doesn't produce formaldehyde (or glucose) from carbon dioxide and water vapor in the air without a plant -- and what the plant needs to do energetically to make it actually happen.

The reaction that takes place in the presence of sunlight looks like this (with bond energies shown in eV):



1. Does this reaction need an energy input to go from left to right, or does it release energy?
2. Calculate the absolute value of the energy input or released in eV in the light reaction.

The reaction that takes place in the absence of sunlight looks like this (with bond energies shown in eV):



3. Does this reaction need an energy input to go from left to right, or does it release energy?
4. Calculate the absolute value of the energy input or released in eV in the dark reaction.

SAMPLE ASSIGNMENT

2

1. Which of the NSI learning outcomes does the sample assignment elicit?
2. Can the assignment elicit performance at different levels (does not meet, partially meets, meets, and exceeds expectations)?
3. Do the level descriptors effectively differentiate levels of performance?
4. What changes would you recommend to the (a) wording of the learning outcomes? (b) level descriptors? (c) assignment design?

NSI INSTRUCTOR RESPONSIBILITIES (FALL 2024 AND WINTER 2025)

Design syllabus

- Incorporate:
 - Course description
 - Gen Ed learning outcomes and rubric

Select assignment(s)

- 1 or more
- Which best elicit evidence of each Gen Ed LO?

Score with Gen Ed rubric

- Used as assessment data, separate from grade for student
- Canvas submissions preferred



WANT FEEDBACK OR MORE HELP?

- You can request individual feedback or a consultation!
 - General Education Assessment Subcommittee (gened@wayne.edu)
 - Office for Teaching and Learning (otl.wayne.edu)
- The [General Education Program Assessment website](#) has information about other aspects of assessment as well.
- Gen Ed instructors can [self-enroll](#) in a Canvas training course for Gen Ed assessment where you will be able to access this information.