

Core Course Assessment Plan, 2018-19
Element 6: Natural Sciences

Please complete all sections; do not delete section information. Submit to Pilot when complete.

SECTION 1: GENERAL INFORMATION

Course Dept. Prefix: BIO Course #: 1120

Semester when assessment will occur: Spring Summer Fall Year: 2018 or 2019

Course Title: Cells and Genes

Section Types and number of sections offered in 2018-19. Complete all that apply.

<u> x </u> Dayton face-to-face	<u> </u> Lake face-to-face
<u> </u> Dayton online	<u> </u> Lake online
<u> </u> Dayton Honors	<u> </u> Lake Honors

Attributes: Integrative Writing in Core
 Multicultural Competency in Core
 Service Learning in Core

Dept. Core Assessment Lead:	<u> Dan Krane </u>	<u> dan.krane@wright.edu </u>
	Mill Miller	mill.miller@wright.edu
	Name	email

List at least two assessors; this may include course instructor only if there are multiple sections and multiple instructors of the course. *Note - The instructor may not assess his/her students' papers.

- Lisa Kenyon
- Len Kenyon
- _____
- _____

SECTION 2: ASSESSMENT PLAN

It is preferable to have a single assessment plan for all sections of a course. If not feasible, please complete an assessment plan for separate sections.

Course Outcomes. Check here if Outcomes have been modified.

The course must address all 5 outcomes, but must assess a minimum of 1 outcome. Highlight in yellow the outcome(s) you will assess. If you have modified the outcomes, please insert here in place of standard outcomes.

1. Understand the nature of scientific inquiry;
2. Critically apply knowledge of scientific theory and methods of inquiry to evaluate information from a variety of sources;
3. Distinguish between science and technology and recognize their roles in society;
4. Demonstrate an awareness of theoretical, practical, creative and cultural dimensions of scientific inquiry; and
5. Discuss fundamental theories underlying modern science.

Assignments. Select a minimum of one option per learning outcome.

Written assignment(s) that addresses/address outcome(s). Include outcome #, title and description for each assignment.

Outcome #: _____ Title:

Description of assignment:

Essay question(s). Provide the question(s) and outcome(s) below.

1. Outcome #: _____ Essay Question: _____
2. Outcome #: _____ Essay Question: _____
3. Outcome #: _____ Essay Question: _____

Pilot asynchronous written discussion that addresses outcome(s). Provide the outcome # and question(s).

1. Outcome #: _____ Discussion Question: _____
2. Outcome #: _____ Discussion Question: _____
3. Outcome #: _____ Discussion Question: _____

X Multiple Choice or T/F Marker questions – 3 to 4 questions per outcome. List the outcome and question numbers. A rubric is not used for Marker questions. “All the above” should not be used as the correct answer more than once. **Courses that are IW or SRV/SRVI must use written assignments for those attributes.** Complete the benchmark: We expect 80% of students to answer 100% of the points.

Outcome #: Understand the nature of scientific inquiry _____

Scoring: The assessment will be scored using a Likert scale using points from 1 (SD strongly disagree) to 5 (SA strongly agree). For some of the items the codes may be reversed since some of the agreement may mean less scientific views.

1. Question: When two different theories arise to explain the same phenomenon (e.g., fossils of dinosaurs), will scientists accept the two theories at the same time?
 - a. Yes, because scientists still cannot objectively tell which one is better; therefore, they will accept both tentatively. SD D U A SA
 - b. Yes, because the two theories may provide explanations from different perspectives, there is no right or wrong. SD D U A SA
 - c. No, because scientists tend to accept the theory they are more familiar with. SD D U A SA
 - d. No, because scientists tend to accept the simpler theories and avoid complex theories. SD D U A SA
 - e. No, the academic status of each theory proposer will influence scientists’ acceptance of the theory. SD D U A SA
 - f. No, scientists tend to accept new theories which deviate less from the contemporary core scientific theory. SD D U A SA
 - g. No, scientists use intuition to make judgments. SD D U A SA
 - h. No, because there is only one truth, scientists will not accept any theory before distinguishing which is best. SD D U A SA
2. Question: When scientists are constructing scientific research, will they use their imagination?
 - a. Yes, imagination is the main source of innovation SD D U A SA
 - b. Yes, scientists use their imagination more or less in scientific research SD D U A SA
 - c. No, imagination is not consistent with the logical principles of science. SD D U A SA
 - d. No, imagination lacks reliability. SD D U A SA

3. Question: Most scientists follow the universal scientific method, step-by-step, to do their research (i.e., state a hypothesis, design an experiment, collect data, and draw conclusions).
- The scientific method ensures valid, clear, logical and accurate results. Thus, most scientists follow the universal method in research. SD D U A SA
 - Most scientists use the scientific method because it is a logical procedure. SD D U A SA
 - The scientific method is useful in most instances, but it does not ensure results; therefore, scientists invent new methods. SD D U A SA
 - There is no so-called the scientific method. Science use any methods to obtain results. SD D U A SA
 - There is no fixed scientific method; scientific knowledge could be accidentally discovered. SD D U A SA
 - F. No matter how the results are obtained, scientists use the scientific method to verify it. SD D U A SA

Collecting and submitting the student assignment(s)

 x Will upload assignment(s) to Pilot

 Will give access to assignment(s) on Pilot

Other: _____

Rubric Selection (A, B). Select the items you feel best match your assignment(s) in the rubric(s) on the next pages. Please highlight in yellow. **If this course has an IW attribute, please also see section B.**

A. Element 6 Rubric. Select the item(s) you will use in your rubric by highlighting in yellow the item(s). You may select one or more of them. You may also choose your own rubric and submit it with this plan. **IF YOU ARE USING MARKER QUESTIONS FOR THE OUTCOME, DO NOT USE THIS RUBRIC.**

Item	Mastery 4	Partial Mastery 3	Progressing 2	Emerging 1
Global Self-Awareness	Effectively addresses significant issues in the natural and human world based on articulating one's identity in a global context.	Evaluates the global impact of one's own and others' specific local actions on the natural and human world.	Analyzes ways that human actions influence the natural and human world.	Identifies some connections between an individual's personal decision-making and certain local and global issues.
Perspective Taking	Evaluates and applies diverse perspectives to complex subjects within natural and human systems in the face of multiple and even conflicting positions (i.e. cultural, disciplinary, and ethical.)	Synthesizes other perspectives (such as cultural, disciplinary, and ethical) when investigating subjects within natural and human systems.	Identifies and explains multiple perspectives (such as cultural, disciplinary, and ethical) when exploring subjects within natural and human systems.	Identifies multiple perspectives while maintaining a value preference for own positioning (such as cultural, disciplinary, and ethical).

Cultural Diversity	Adapts and applies a deep understanding of multiple worldviews, experiences, and power structures while initiating meaningful interaction with other cultures to address significant global problems.	Analyzes substantial connections between the worldviews, power structures, and experiences of multiple cultures historically or in contemporary contexts, incorporating respectful interactions with other cultures.	Explains and connects two or more cultures historically or in contemporary contexts with some acknowledgement of power structures, demonstrating respectful interaction with varied cultures and worldviews.	Describes the experiences of others historically or in contemporary contexts primarily through one cultural perspective, demonstrating some openness to varied cultures and worldviews.
Personal and Social Responsibility	Takes informed and responsible action to address ethical, social, and environmental challenges in global systems and evaluates the local and broader consequences of individual and collective interventions.	Analyzes the ethical, social, and environmental consequences of global systems and identifies a range of actions informed by one's sense of personal and civic responsibility.	Explains the ethical, social, and environmental consequences of local and national decisions on global systems.	Identifies basic ethical dimensions of some local or national decisions that have global impact.
Understanding Global Systems	Uses deep knowledge of the historic and contemporary role and differential effects of human organizations and actions on global systems to develop and advocate for informed, appropriate action to solve complex problems in the human and natural worlds.	Analyzes major elements of global systems, including their historic and contemporary interconnections and the differential effects of human organizations and actions, to pose elementary solutions to complex problems in the human and natural worlds.	Examines the historical and contemporary roles, interconnections, and differential effects of human organizations and actions on global systems within the human and the natural worlds.	Identifies the basic role of some global and local institutions, ideas, and processes in the human and natural worlds.
Applying Knowledge to Contemporary Global Contexts	Applies knowledge and skills to implement sophisticated, appropriate, and workable solutions to address complex global problems using interdisciplinary perspectives independently or with others.	Plans and evaluates more complex solutions to global challenges that are appropriate to their contexts using multiple disciplinary perspectives (such as cultural, historical, and scientific).	Formulates practical yet elementary solutions to global challenges that use at least two disciplinary perspectives (such as cultural, historical, and scientific).	Defines global challenges in basic ways, including a limited number of perspectives and solutions.

B. If this is an IW course, you will use the items on this page. You may select one or more of them. Please highlight in yellow.

Item	Mastery 4	Partial Mastery 3	Progressing 2	Emerging 1
Includes considerations of audience, purpose, and the circumstances surrounding the writing task(s).	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses all elements of the work.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s) (e.g., the task aligns with audience, purpose, and context).	Demonstrates awareness of context, audience, purpose, and to the assigned tasks(s) (e.g., begins to show awareness of audience's perceptions and assumptions).	Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks(s) (e.g., expectation of instructor or self as audience).
Content Development	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate, relevant, and compelling content to explore ideas within the context of the discipline and shape the whole work.	Uses appropriate and relevant content to develop and explore ideas through most of the work.	Uses appropriate and relevant content to develop simple ideas in some parts of the work.
Formal and informal rules inherent in the expectations for writing in particular forms and/or academic fields (please see glossary).	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices	Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s), including organization, content, presentation, and stylistic choices	Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation	Attempts to use a consistent system for basic organization and presentation.
Sources and Evidence	Demonstrates skillful use of high-quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing	Demonstrates consistent use of credible, relevant sources to support ideas that are situated within the discipline and genre of the writing.	Demonstrates an attempt to use credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing.	Demonstrates an attempt to use sources to support ideas in the writing.
Control of Syntax and Mechanics	Uses graceful language that skillfully communicates meaning	Uses straightforward language that generally conveys meaning to	Uses language that generally conveys meaning to readers with	Uses language that sometimes impedes

	to readers with clarity and fluency, and is virtually error-free.	readers. The language in the portfolio has few errors.	clarity, although writing may include some errors.	meaning because of errors in usage.
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SECTION 3: UCRC COMMITTEE REVIEW ONLY. DO NOT delete this section.

Item	Complete / NA / Revision Requested	Comments
Learning Outcomes for Element 6 Natural Science	Complete	
Assignments matched to Element 6 LOs	Complete	
Rubric for LOs	Complete – benchmarking is provided for multiple choice questions.	Recommend to lower the benchmark. Having 50% of the students scoring a 100% is a high expectation. Recommend lowering the second percentage to 70% which is a typical C. (Could also do 80%, etc.).
Rubric for IW Attribute	N/A	
Assigned Approved Reviewers	Complete	

Committee Review Completed

Committee Chair Signature Dr. Anne M. Bowling Date December 2018

Date Report Submitted: 6/5/2022

Element: Core Element 2 – Mathematics or Core Element 6 – Natural Science

Academic Year: Element 6 – 2019-2020 Element 2 – 2019 to 2020 (adjust dates based on data collection).

Course and Sections Assessed:

Describe the final assessment plan that was implemented and explain any changes made to the approved plan.

- I. **Core Learning Outcomes Assessed (list):**
Outcome #1: Understand the nature of scientific inquiry.
- II. **Procedures Used for Assessment**
Data for assessment was collected through a Qualtrics survey.
- III. **Summary of Assessment Results:**
There was a lot of variance in the correctness of the question responses. Easiest question: 93% correct; most difficult question: 36% correct; average = 60% correct. Correctness was based on a choice of “Agree” or

“Strongly Agree” on the positively worded questions or a choice of “Disagree” or “Strongly Disagree” on the negatively worded questions.

Benchmark Met Yes or No Unknown

If not met, please identify conditions (if any) that may have impacted these findings.

We found that the survey was confusing for the students, and actually has questionable content validity with respect to the nature of science in that it does not account for human nature in science. For example, it is true that scientists do prefer theories they are more familiar with even if that psychological position does not necessarily align with the ideal practice of science. Would students agree with this question due to lack of understanding or because they are not naïve about human nature?

IV. ACTIONS TAKEN/PLANNED TO IMPROVE STUDENT LEARNING

We continue to emphasize scientific methodology in our labs and help students understand both inductivist and deductivist approaches to scientific inquiry in both the labs and lectures.

V. Assessment Administration Feedback

UCOC Report Review

Item	Complete/NA	Revision Requested	Comments
Identified Outcome Assessed	XX		
Identified Procedure for Assessment	XX		
Summary of Results	XX		
Results Shared with Instructor, Dept Curriculum Committee, etc.	XX		
Plan for Improvements	XX		

Committee Review Completed XXX

Committee Chair Signature Dr. Anne M. Bowling Date 12/6/2022