

# Sustainability Literacy at Dickinson College

## 2023 Summary

### Introduction

A survey to assess sustainability literacy of Dickinson students was administered to a representative sample of 1000 students in April 2023, representing 47% of all matriculated students at the college. The sample included 250 first year students, 250 sophomores, 250 juniors, and 250 seniors. 238 students completed the survey, for a response rate of 23.8%. This includes 42 first year students, 68 sophomores, 65 juniors, and 62 seniors. 24 of the students had not completed a sustainability course at the time the survey was administered, 63 had completed one sustainability course, 76 had completed two to three sustainability courses, and 75 had completed four or more sustainability courses.

Comparisons across the class years provide pre- and post-assessments of sustainability literacy near the end of the first, sophomore, junior, and senior years of undergraduate studies at Dickinson. Comparisons are also made for students who had not completed any sustainability courses and students who had completed 1, 2 to 3, and 4 or more sustainability courses.

All Dickinson students are required to complete one sustainability course to graduate, though many take more than one. In the last three years, 2021, 2022, and 2023, 84% to 92% of graduates completed two or more sustainability courses during their Dickinson experience, 53% to 55% completed four or more sustainability courses, and 24% to 27% completed six or more sustainability courses. The sustainability courses are offered in over 30 of Dickinson's 44 academic programs and span the arts, humanities, social sciences, and physical sciences.

Because of the diverse disciplinary fields of the sustainability courses taken by Dickinson students, students' exposure to and engagement with sustainability concepts, topics, and content are highly varied. Consequently, the survey does not serve as a tool for assessment of learning outcomes for a defined program of study.<sup>1</sup> But it can serve as an indicator of students' exposures to and understanding of selected topics that are important for sustainability literacy and may be useful for helping to identify possible strengths, weaknesses, and gaps in Dickinson's educational programs.

The survey included 12 multiple choice questions that address 4 areas of sustainability competency: futures thinking, systems thinking, values thinking, and strategic thinking. Upon completion of the literacy survey, respondents are directed to a webpage with the questions, correct answers, and links to sources of information to learn about each question topic. See [Sustainability Literacy Questions and Answer Key](#).

### Survey Results

The percentages of students who answered each question correctly are displayed in Figure 1. The survey results indicate that a majority of Dickinson students are exposed to information about many important sustainability topics and concepts and can correctly answer questions about them. An overwhelming majority of Dickinson students, more than 80%, correctly answered questions about intergenerational equity, the United Nations' definition of sustainable development, and criteria that are commonly considered in decision-making to advance

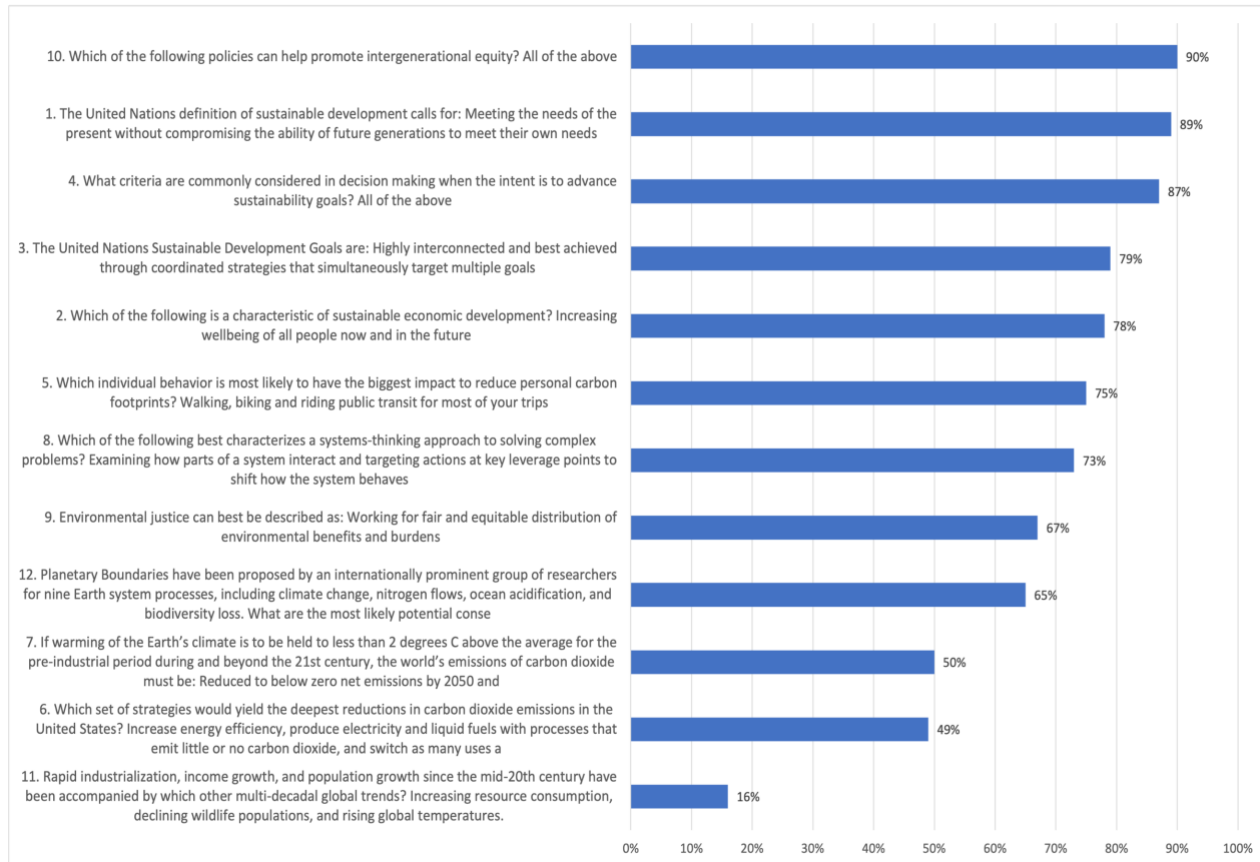
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<sup>1</sup> A formal assessment of student learning in courses that fulfill Dickinson's sustainability graduation requirement was completed in fall 2023. The assessment was based on the performance of 502 students on sustainability-related assignments in a sample of half of the sustainability courses offered in spring 2023. Over 80% of students demonstrated achievement of satisfactory or stronger learning with respect to sustainability learning outcomes and 15% demonstrated emerging learning. We also asked students in all of the sustainability courses offered in spring 2023 to self-assess their sustainability learning using the IDEA course evaluation system. Over 70% of 383 students who responded reported making substantial or exceptional progress in thinking critically about sustainability and another 18% reported making moderate progress.

sustainability goals. A substantial majority of students, between 70% and 80%, can correctly answer questions about the U.N. Sustainable Development Goals, characteristics of sustainable development, the carbon footprints of individual behaviors, and characteristics of systems thinking.

Two-thirds of students correctly answered questions about environmental justice and the implications of crossing “planetary boundaries” while roughly half of students correctly answered questions about the depth of greenhouse gas emissions reductions that are necessary to limit global warming to less than 2°C and about strategies that can yield the deepest reductions. Only 16% of students correctly answered a question about global economic, demographic, and environmental trends.

Figure 1. Percentage Correct Answers by Question

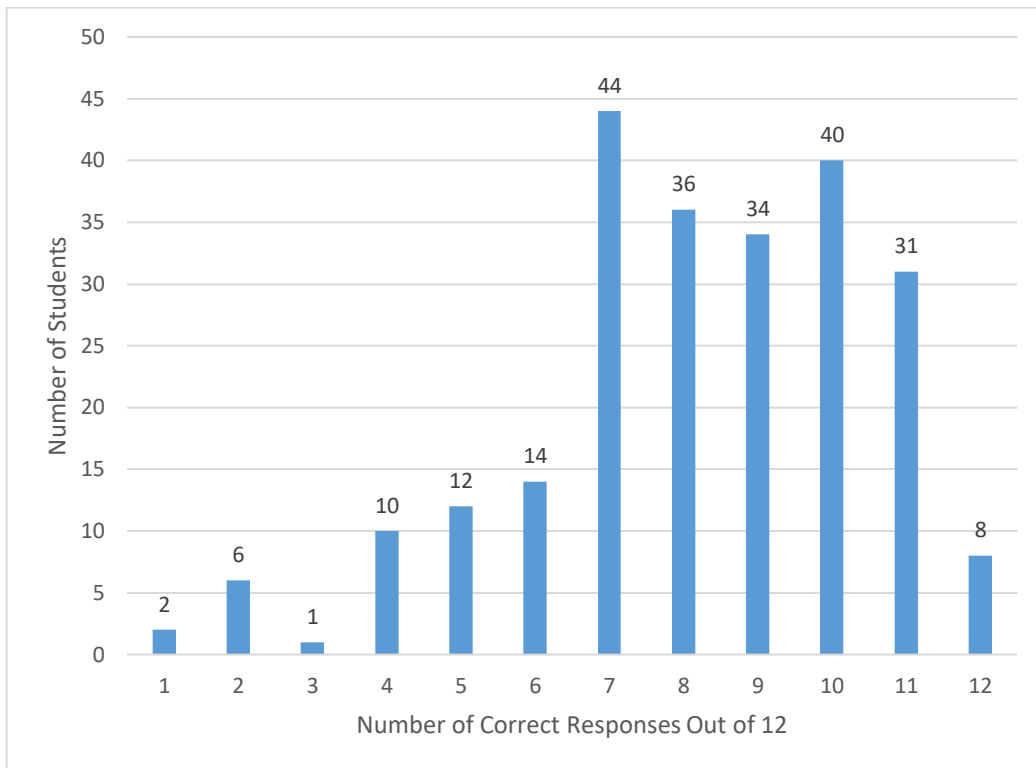


While the results indicate most Dickinson students are knowledgeable about many of the sustainability issues addressed by the survey, the results also suggest important gaps in students' learning. The percentages of students who demonstrated knowledge of the greenhouse gas emission reductions needed to avoid warming beyond 2°C, strategies that are likely to have the greatest impact for reducing emissions, and the implications of crossing planetary boundaries are relatively modest. The finding that one-third to one-half of our students could not answer questions on these topics is worrisome given the importance of global climate change. Also worrisome is the small percentage of students who correctly answered the question about economic, demographic, and environmental trends. The majority of Dickinson students demonstrated lack of awareness concerning positive global trends for reducing extreme poverty, improving childhood survival, increasing yields of many crops, and improving air quality that have substantially improved human wellbeing.

Figure 2 presents the distribution of numbers of questions answered correctly. The number of questions answered correctly by students ranges from 1 correct answer to 12 correct answers out of 12 questions. The average number of correct answers is 8.1 and the median is 8, which corresponds to an average correct response

rate of two-thirds. Slightly more than 80% of students answered more than half the questions correctly, one-third answered 10 or more of the questions correctly, and 3% answered all 12 questions correctly. 19% of students answered half or less of the questions correctly.

Figure 2. Distribution of Correct Responses



The means, medians, and standard deviations for numbers of correct answers broken down by class year, division of major, and the cumulative number of sustainability courses completed by students are presented in Table 1. First year students answered the lowest number of questions correctly on average and juniors the highest number. Sophomores and seniors performed very similarly to each other. The mean number of correct answers for first year students is less than the mean for other class years, as hypothesized, and the difference is statistically significant (p value = 0.02 for 1-tail test).<sup>2</sup> However, while statistically significant, differences in means by class year are small in magnitude.

Differences are also measured in the mean number of correct answers for different numbers of sustainability courses completed by students. As expected, the greater the number of courses completed, the higher the mean number of correct answers. The mean number of correct answers for students who had not completed a sustainability course is less than the mean for students who had completed four or more courses, and the difference is statistically significant (p value = 0.02 for 1-tail test). Again, however, the differences are small in magnitude.

Comparisons are also made across students' major fields of study. Students with majors in interdisciplinary programs have a higher mean of correct answers than students majoring in single discipline programs in the arts & humanities, social sciences, and laboratory sciences. Students majoring in laboratory sciences have the lowest mean of correct answers, and the difference is statistically significant (p value = 0.02 for 2-tail test). But once more, the differences are small.

<sup>2</sup> Statistical analyses of the survey data was performed by Tai Nguyen '25 and Trang Vu '25.

It was anticipated that students in higher class years, and students who had completed more sustainability courses, would perform substantially better than their peers on the knowledge survey. The results support these hypotheses. But the differences, though statistically significant, are marginal in size and less than expected. It appears that performance on the survey does not correlate strongly with time spent learning in the classroom. Instead, we hypothesize that knowledge about the topics addressed by the survey may reflect learning outside of the classroom, which might correlate with students' interests in sustainability related issues.

*Table 1. Number Correct Answers by Class Year, Cumulative Number of Sustainability Courses Completed, and Division of Major*

	<b>Mean No. Correct</b>	<b>Median No. Correct</b>	<b>Standard Deviation</b>
All Students	8.15	8.0	2.34
Class Year			
First Years	7.24	7.0	2.37
Sophomores	8.19	8.5	2.32
Juniors	8.65	9.0	2.45
Seniors	8.16	8.0	2.13
Number of Sustainability Courses Completed			
0 Sustainability Courses	7.33	8.0	2.39
1 Sustainability Course	8.10	8.0	2.35
2 to 3 Sustainability Courses	7.97	8.0	2.26
4 or More Sustainability Courses	8.64	9.0	2.44
Major			
Division 1, Arts & Humanities	8.57	9.0	2.10
Division 2, Social Sciences	8.55	9.0	2.37
Division 3, Lab Sciences	7.86	8.0	2.65
Interdisciplinary Programs	9.12	10.0	2.09