Teaching Toward Sustainability: Pedagogy, Climate, and Environmental Justice

The following guide builds on the work of faculty and staff across this campus, including the Office of Sustainability & Climate Action, the Environmental Science Department, the Digital Humanities Center, and many instructors who have for decades prioritized climate science, the human-nature relationship, and sustainability in their teaching. This guide is also a work in progress. It represents the CEP's first effort in defining sustainability for pedagogical intervention, and offers strategies for integrating sustainability concepts and competencies within a course. While this first iteration focuses predominantly on sustainability as an urgent area of interdisciplinary teaching and learning, we also address invitationally topics such as environmental justice and ecocriticism. We welcome general feedback, specific teaching strategies or examples, and additional resources as we continue to build this guide in collaboration with faculty and staff.

At the core of this guide is a provocation to imagine sustainability as an integral component, a framework that can guide pedagogical approaches as well as specific units. Sustainability can be infused and integrated into an existing course through learning objectives, assessments, learning activities, and course content. This guide focuses on definitions and approaches to sustainability pedagogy, and the CEP wants to think with the Barnard community about what it would mean to engage in sustainable teaching practices–beyond and in addition to teaching sustainability, climate, and environmental justice as content areas and skill building frameworks.

To see how other Barnard courses have incorporated sustainability into their curricula, you can browse offerings on Barnard's Sustainability & Climate Action website. Courses span departments such as Environmental Science; Urban studies; Women's Gender, and Sexuality Studies; Anthropology; Biology; and Architecture. Instructors can have their courses added to this spreadsheet by emailing Leslie Raucher (lraucher@barnard.edu).

The Digital Humanities Center (DHC) at Barnard has also done considerable work on sustainability, including "The Digital is Material," a presentation and meditation by Alicia Peaker, Associate Director of the DHC. Additionally, the DHC created in collaboration with other colleagues Digital Humanities and the Climate Crisis: a manifesto. As instructors consider the intersection of digital work and sustainability in their courses, the CEP recommends engaging with the resources and services offered by the DHC to foreground for students the materiality of the digital and considerations for harm reduction in digital work.

Defining sustainability

What does it mean to be sustainable?

The CEP offers the following definitions of key sustainability concepts for instructors who may be new to sustainability, or as starting points for classroom activities (e.g., inviting students to analyze, critique, conduct further research).

Sustainable Actions

A sustainable action is one that operates within the inherent limits of the economic, social, and environmental resources it draws upon, while adequately meeting its intended purpose (Farley et al., 2013/2020). All actions, like production and consumption, rely on the use of resources. These resources are limited by their initial availability, rate of consumption, and rate of regeneration. Economic and social resources are not only limited by their inherent bounds of regeneration and depletion, but also by the carrying capacity of the earth (Farley et al., 2013/2020). Furthermore, sustainable actions equitably distribute resources without trying to expand their limits, adequately providing energy, food, and jobs without harming the Earth or its communities.

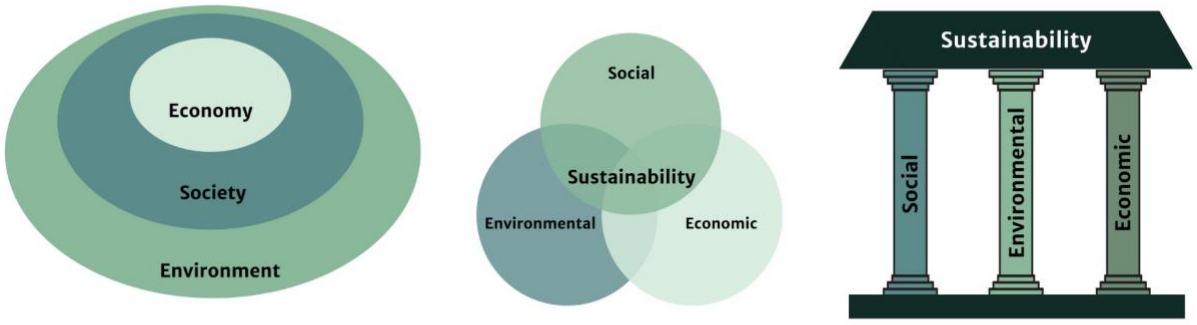
Sustainable Systems

Sustainable systems are networks of sustainable actions. A sustainable system is circular and regenerative, operating from production to consumption without waste. Consumption remains at levels that can be supported, products are reused, and anything that cannot be reused is recycled into new products. As Professor Sandra Goldmark of Barnard College explains, “[J]ust like in the natural world, every by-product or outcome of any process gets fed back into another process. There’s no material that is ever considered unused” (Smith, 2021).

What is sustainability?

UN Brundtland Definition

Sustainability is defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (UN Brundtland Commission, 1987). Sustainability is at its core a systems-based and interdisciplinary approach that aims to protect the environment while strengthening communities and supporting economic prosperity (Environmental Protection Agency). The relationship between the environmental, social, and economic pillars has also become a dominant approach for defining sustainability and the interconnected impacts of climate change. The following diagrams represent some of the most common approaches for visualizing these three pillars of sustainability.



1.Concentric circles 2. Interlocking circles 3. Pillars

Critiques of the UN Brundtland Definition

Though central to contemporary understandings of sustainability, the UN Brundtland definition and three-pillar framework have also prompted a range of scholarly debate, including critiques that the Brundtland report assumes a capitalist modernity as its starting point (Escobar, 1995) and problematically confounds the difference between ecology and economy (Santamarina, 2016). Along similar lines, Hudler et all write that "sustainability efforts that place an ‘emphasis on the economy and environment’ have dominated applications of sustainability and sustainable development,” making it “harder for people to understand how the environment and social sustainability are interrelated” (2021, p. 80).

Teaching the Debate

At the CEP, we draw from UN Brundtland’s definition as a foundation and starting point, while also leaving open the possibility that instructors and students may wish to (re)define sustainability and environmental justice through their own methods and in reference to emerging scholarship. We see tensions within the scholarship, like tensions in a classroom, as productive of learning. In teaching the debate, and asking students to trace the concept of sustainability in the scholarship, including scholars' resistances to the appropriation of sustainability to economic interests, could support the development

of students' research skills while revealing for them the relationship between scholarship and activism.

What is systems thinking?

Systems thinking is increasingly recognized as a vital approach in understanding sustainability and climate change, because it offers an interdisciplinary and de-siloed paradigm for exploring the interconnected nature of the environmental, social, and economic worlds (Ballew et al, 2019, p. 8214). In "Sustainability: If it's everything, is it nothing?," Farley and Smith offer a useful articulation of this interdependence at the core of systems thinking: "We do not have environmental problems per se," they write. "We have environmental consequences resulting from the way we have designed our business, social, economic, and political systems" (2013, p. 178).

Systems Thinking at Barnard

Barnard's Climate Action Vision, the result of a campus-wide collaborative effort from 2016-2018, recognizes the impact of climate change across "all realms of social, ecological, and economic activity" and calls for "solutions [. . .] from a wide range of disciplines" (2019). Systems thinking is especially applicable to engaged pedagogy because it encourages interdisciplinary thinking and lays the foundation for an intersectional understanding of the impacts of climate change.

What is intersectional sustainability?

Teaching sustainability through systems thinking complements an intersectional exploration of how issues of race, class, gender, gender identity, sexual orientation, ability, and environmental depletion are interconnected. Intersectional sustainability argues that environmental injustices occur as a result of racial marginalization, class differences, gendered discrimination, poverty, and inaccessibility and discrimination in the built and social environment.

Val Plumwood's *Feminism and the Mastery of Nature* (1993) offers an early articulation of the intersections at stake in a critical ecological feminism:

> It is usually at the edges where the great tectonic plates of theory meet and shift that we find the most dramatic developments and upheavals. When four tectonic plates of liberation theory—those concerned with the oppressions of gender, race, class and nature—finally come together, the resulting tremors could shake the conceptual structures of oppression to their foundations. (p. 1)

By examining the habits of domination hidden in the dualism between reason and nature, Plumwood offers a corrective to a prevailing ecofeminist tendency to situate women and people of color on the side of nature and to thus take this dualism for granted. We draw on this philosophical reading of ecofeminism to emphasize the truly interdisciplinary stakes of environmental justice, and to indicate the potential for collaboration and co-teaching within and across the disciplines at Barnard.

Intersectional sustainability at Barnard

Barnard contributes to an interdisciplinary culture of pedagogy that values collective work toward social justice across different fields. Intersectional sustainability connects issues such as the ongoing gentrification of cities, Indigenous displacement and struggle, and the devaluation of Indigenous knowledge about land. By integrating sustainability within a course, students can learn to think locally about the distinctive geological or environmental factors of NYC, the neighborhood, and the environmental racism that has resulted from economic, social, and political histories.

The Office of Community of Engagement & Inclusion has recently curated a list of Barnard student recommendations for Spring 2022 courses, in which students have the opportunity to engage in local advocacy and learn about issues affecting underserved communities.

For instructors interested in considering the role of land acknowledgements in their courses, and how we might go beyond them to engage in Indigenous pedagogy, you

might find the CEP's Fall 2021 land acknowledgement workshop series summary helpful as a potential starting place.

Pedagogical models and approaches toward sustainability

Integrating sustainability concepts within core content

InTeGrate, a peer-reviewed repository of sustainability teaching resources, recommends integrating sustainability concepts within the core content of the course. InTeGrate specifically advises faculty to think of sustainability concepts as part of the "trunk" of the course, rather than as a "branch" or "twig." While this approach does ask instructors to widen the frame within which core concepts are taught, it also eliminates the need for faculty to make room in their curricula for new sustainability content.

Examples of sustainability as "trunk" of the course:

- An **ethics** or **political philosophy** course could consider the relationship between the impacts of climate change and ethics by asking questions, such as who survives? who gets to live well? and how do we live well together? (Siperstein, Hall, LeMenanger 2017).
- In an **economics** course where negative externalities are a core part of the content, an integrated approach might draw on climate change as a timely example of market failure.
- In a **geoscience** course centered on the Earth as a complex system, the sustainability concept of Earth as a finite resource might be examined through a comparison of the anthropogenic vs. natural carbon cycles.
- In a **history** course critically engaged with the concept of "Manifest Destiny," western expansion could be understood from the perspective of environmental impact and the displacement of Indigenous people.
- In a **modeling** course, the principles of environmental justice can be integrated within existing content by examining the relationship between surface water flow and different demographic settlement by examining streamflow data and digital imagery tools of Google Earth.

For additional examples of how sustainability and environmental justice concepts and content have been integrated within Barnard courses, please see Sustainability & Climate Action website.

Drawing on sustainability as a narrative frame in case-based learning

For courses where it might not be possible or appropriate to integrate sustainability within the core content of the course, another option is to invite students to engage with relevant disciplinary skills, methods, or concepts through case-based learning. In this approach, sustainability, climate science, or environmental justice could serve as a frame or narrative within which core skills or concepts can be applied or examined. InTeGrate also provides this example of a case study for classroom use.

Exploring climate science and systems thinking through place-based learning

Place-based learning focuses on "how the local landscape, community infrastructure, watersheds, and cultural traditions all interact and shape each other" (Burns, 2011). In addition, place-based learning actively connects learners to the local community (Sobel, 2004), and provides a way to explore and question economic, ecological, social, and political relationships from the perspective of their surrounding community (Burns, 2011).

For example, in a community with a high mosquito population in residential areas, students in a genetics course could breed native guppies which prey on mosquito larvae and release them into local stagnant ponds as a way of controlling mosquito population without aerial pesticides (Sobel, 2004). While these students study the genetics of the guppies, students in statistical courses can study population growth of the guppies and the mosquitos; students in ecological courses can study the impact of the guppies on the local environment.

Glossary

- **Sustainable:** to operate within inherent resource limits and equitably distribute resources to communities
- **Sustainability:** the practice of improving a system so that it is sustainable and maintainable; moving from a linear system to a circular system
- **Circular system:** a system that operates without the waste of or needle addition of resources, all products are reduced, reused, and recycled
- **Linear system:** a system that operates in a linear path from taking resources, to making products, to consuming products, and then to the waste of unused products
- **Resource limit:** the maximum amount of a resources available; depends on rate of consumption/depletion and rate of regeneration
- **Environmental primacy:** the idea that all resources are limited by the natural carrying capacity of the Earth; all economic and social resources are rooted in environmental resources
- **Systems thinking:** a holistic approach to understanding the interconnectedness between economic, social, and environmental pillars
- **Intersectional sustainability:** an approach that analyzes how social injustices affect sustainability, exposes hierarchies within sustainability movements and policies and centers the relationships between marginalized individuals and communities and the environment
- **Ecology:** the study of the interrelationships and connections between all living organisms, including humans, and their physical environments; it centers the benefits of ecosystems and approaches nature as encompassing and synthetic rather than as fragmented

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The CEP has compiled the following resources on teaching sustainability, climate, and environmental justice

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Special thanks

Special thanks to Sumayya Mokit, Skyler Evans, and Joscelyn Jurich for researching and authoring portions of this guide; Sandra Goldmark for multiple rounds of feedback and supportive guidance; and Annabelle Tseng and Hana Rivers for editorial support.