

Duke's Climate and Sustainability Fluency Framework

Introduction

In 2022, Duke University announced its ambitious Climate Commitment to integrate climate change across every aspect of its mission – education, research, external engagement, campus operations and community partnerships. This commitment is rooted in a conviction about the profound implications of climate change, the centrality of justice in sustainability challenges, and the important role that higher education institutions can and should play to address the planetary crisis.

In 2024, the Education Integration sub-committee of Duke's Climate Commitment Advisory Council (CCAC) formed, including faculty, staff, and students from across the Duke community.¹ Its mission is to partner with Duke's Schools and campuses (Durham, Beaufort, Kunshan, Singapore) to create and implement strategies to integrate climate and sustainability (C/S) programming across Duke's educational mission.

The goal of this initiative is to prepare all members of Duke University's learning community with the competencies they need to engage thoughtfully in explorations about climate and sustainability, including inquiries into the root causes and far-reaching consequences of our current situation.² The intention is to equip and encourage the entire community to take meaningful action in their personal and professional lives toward a future of wellbeing within a healthy and resilient biophysical environment.

To meet these goals, this document establishes a common frame of understanding about the meaning of C/S fluency at Duke University and is intended to facilitate collaboration between Climate Commitment committee members and all the relevant stakeholders in Duke's educational mission. The CCAC Education Integration sub-committee is leading this process, but ultimate ownership and accountability of the educational strategy resides in Duke's Schools, departments, and units.

The resulting strategy is intended to specify what climate and sustainability content already exists across Duke, and/or can be integrated into curricular, co- and extra-curricular, experiential learning programs, and informal learning settings; what audiences and formats are most appropriate for sharing this content; and what educational content should be designed by whom and by when to shape an effective response to climate change, biodiversity loss, and environmental degradation for our community. This framework is primarily definitional, setting the stage for documenting current efforts, establishing strategic vision, and ultimately developing innovative educational programming.³ Ultimately, it is an open invitation to the wider Duke community to engage in the climate conversation.

¹ This framework was initially drafted by a working group in 2022 and has been substantially elaborated by a task force of the Climate Commitment's Education Sub-committee in Spring 2024. We thank previous participants for their contributions and look forward to the ongoing evolution of this document as we attempt to put its principles into practice. If you have questions or feedback, please contact sub-committee member and faculty co-chair Dan Vermeer (Associate Professor of the Practice, Fuqua School of Business) at: dv24@duke.edu

² Our definition of Duke "learner" is expansive, including faculty, graduate and undergraduate students, staff, alumni, and community partners.

³ Other task forces of the Educational Sub-committee are developing an educational inventory, describing a "north star" destination, creating an evaluation approach, and co-developing educational plans with Duke's Schools and units. These elements will ultimately be integrated in Duke's system-wide educational strategy.

Our approach - principles and definitions

Dialogical and inquiry-focused

Our definition of fluency does not refer to a standard canon of knowledge, but rather a dynamic ability of all community members to engage each other in productive conversation and joint exploration.⁴

We believe that the quest for climate⁵ and sustainability⁶ fluency is not a static destination, but an open invitation to ongoing collaboration across many types of boundaries – disciplines, geographies, status, identity, etc. In other words, we do not expect every Duke community member to become a climate expert, or even that the two terms (climate and sustainability) cover all aspects of our challenge. Rather, we envision that our educational mission will be animated by a spirit of **dialogue and inquiry**, where all learners seek understanding, informed by rigorous research and empirical insights, open to multiple perspectives, and committed to strategic action. For these explorations to be constructive, we emphasize the importance of curiosity, imagination, and openness to new possibilities.

Orientation toward holistic competence

Our approach to fluency is competency-based, providing support for learners to not only master a body of knowledge, but also cultivate the critical skills, behaviors, and attitudes that enable them to participate effectively and responsibly in climate and sustainability-related action.⁷ Specifically, primary **skills** may include the ability to engage in an effective dialogue; to identify and implement strategies; and to distinguish trusted information from misinformation. Target **behaviors** may include rigorous inquiry; respect for and interest in others' opinions, priorities, and positionality; active engagement in democratic institutions and processes; continuous efforts to reduce one's personal footprint, etc. Desired **attitudes** may include a sense of agency; recognition of the value of different cultures, disciplines, and value systems in providing distinct and valuable perspectives and solutions; and support to those adversely impacted by climate change. A sense of humility will also enable learners from different orientations and backgrounds to converge on shared insights.

Embracing diversity

Our definition of climate and sustainability fluency requires learners to master basic knowledge, skills, behaviors, and attitudes, and to successfully incorporate this learning into community, professional, educational, and other life contexts. However, we expect the specific configurations of competencies appropriate to different communities of learners to vary significantly, and to change and evolve over time. Indeed, we explicitly promote cross- and interdisciplinary learning, and encourage approaches that extend beyond familiar and comfortable paradigms. We observe that the systems, values, and paradigms that created today's challenges may not provide the approaches necessary to build a better future.

⁴ In a similar way, we see this framework as a “living document” that will continue to evolve through conversations and be revised as circumstances and priorities shift over time.

⁵ **Climate change** is one of the defining challenges of our era, caused by increasing greenhouse emissions, and resulting in increasing impacts on ecosystems, infrastructure, economy, and quality of life.

⁶ **Sustainability** has many definitions, but generally refers to the balanced integration of systems (environmental, social, and economic) to meet the needs of the present for all living beings without compromising the needs of future generations of all living beings. See [Report of the World Commission on Environment and Development: Our common future](#) (1987). Accessed February 10, 1-300.

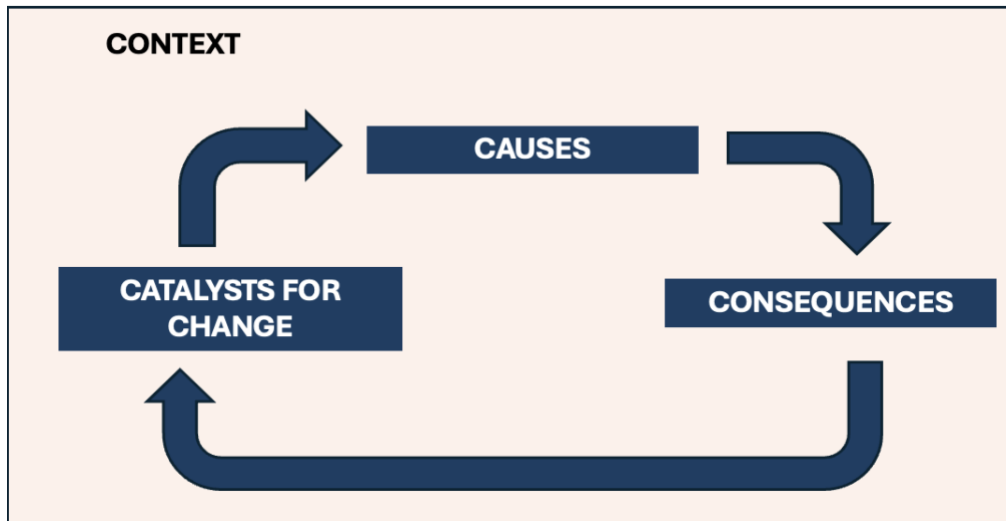
⁷ An outline of types of knowledge included in our fluency framework can be found below in the *Logic of Fluency* section below.

Wherever possible, we encourage efforts to “connect the dots” between scientific, societal, and humanistic approaches.⁸ While advances in technology are necessary to meet climate challenges, we recognize the complex interactions between human communities and technological systems. For example, changes in energy infrastructure like a shift from coal to renewable power may have significant negative consequences for both the coal “energy community” and low-income communities that may not be able to afford the new technology. These dynamics have important ethical and justice implications that should be explored.

The Logic of Fluency - The Duke 4-C Pathway

C/S fluency is built on fundamental competencies that connect understanding of causes and drivers of the planetary crisis to their implications for society and the planet to the most effective pathways for action. In this section, we will explore what competencies are needed at each stage, organized into four categories (The Duke 4-C Pathway): **Context, Causes, Consequences, and Catalysts for Change**. These are logically linked, so that learners can systematically connect their understanding of climate and sustainability, informed by their discipline or position, to broader conversations, debates, and specific courses of action.

Figure 1



Graphic highlighting relationships between core categories of Duke’s 4C Pathway.

Context:

Engaging in thoughtful dialogue and inquiry about climate and sustainability requires basic appreciation for the context of these challenges. This first “C” in our framework informs all other aspects and encourages consideration of non-climate topics (e.g. political economy, theology, inequality) that shape our experience and discourse of climate and sustainability. While this context may vary across different Duke learning communities, it is important to clarify the pre-requisite elements that might be included.

- **Knowledge Basics:**
 - bio-geo-atmospheric systems and how they work.
 - historical contexts, especially the social, political, institutional, and economic systems that are inter-connected, have evolved over time, shape current outcomes and influence future possibilities.

⁸ “Societal” and “humanistic” are used here to refer broadly to the social sciences and humanities but could be extended to other adjacent disciplines. This list is not intended to be exhaustive, but to indicate the range of disciplines that would be involved in this ongoing dialogue.

- social structures, including but not limited to those that have led to the differential ability of people and communities to address and adapt to climate change.
- cultures, values, and identities.
- *Thinking in Systems*: provide learners with a way of thinking about how complex systems operate. Our approach will be to make explicit the connections, inter-dependencies, and feedback loops between elements.
- *Disciplinary Specificity*: Each Duke department/school will bring its own expertise and priorities to these contexts and encourage learners to bridge disciplinary knowledge to climate change and sustainability challenges as a cross-cutting challenge.

Causes:

Once the context for discussion has been established, learners will want to probe the root causes that have created the climate crisis. In this section, we assess the key factors involved in causing climate instability and environmental degradation, including:

- *Systems*: what are the systemic drivers behind economic activity and political decision-making? How are systems constructed, physical environments shaped and remade, and politics transformed?
- *Built environment*: How do our cities, energy generation and food systems, transport networks, buildings, waste disposal and other infrastructure contribute to climate and environmental problems? What are the costs and vulnerabilities of our existing infrastructures?
- *Individual behavior*: In what ways do individual decisions about consumption, travel, dietary choices, and waste disposal contribute to or mitigate environmental problems? What are the limits of individual agency?
- *Politics*: what are social and political factors that impact collective behavior and public policy making?

Consequences:

Causes and consequences are linked through an intricate network of feedback loops, creating short-term, long-term, global, local, incremental, and system-wide transformations. In this section, we highlight the primary domains through which we experience the impacts of climate change and environmental degradation. These include:

- *Ecosystem functions*: including (but not limited to) climate instability, resource depletion, biodiversity loss and ocean acidification.
- *Infrastructure threats*: evaluating impacts on and changes to energy and food systems, transport, waste disposal, and other parts of the built environment.
- *Economic impacts*: accounting for the economic and societal costs of environmental disruptions, and their long-term consequences for wealth distribution, public and private investment, stakeholder expectations, measures, and incentives.
- *Social, cultural, and political consequences*: including the potential for erosion of democratic institutions, damage to local communities, and degrading quality of life.
- *Human health burdens*: assessing a range, severity, and cost of impacts on human well-being, from physical disease and heat-related problems to mental and psychological health.
- *Interactions and intersectionalities*: understanding the cause-and-effect relationships, system interactions, national and regional dynamics, and personal or collective identities that shape society's experiences.

Catalysts for Change

In this section, we consider possible pathways for action and system transformation.⁹ Note that these catalysts include strategies for both mitigating and adapting to climate change and environmental problems.

- *Designing governance structures and public policies* to shift incentives and achieve more equitable outcomes.
- *Centering indigenous and historically marginalized people and voices* through highlighting models of ecological and social protection/restoration embedded in indigenous knowledge systems and enabling their application in practice.
- *Exploring different economic incentive structures* that promote ecosystem health as well as social wellbeing.
- *Changing personal, communal, and societal lifestyles and behaviors* by considering patterns of consumption and product life cycle impacts and determining where personal choices can have substantial impacts vs where they likely won't.
- *Shifting financial investment* by redirecting capital flows away from environmentally or socially destructive practices and toward new sustainable technologies and approaches.
- *Creating stories that increase awareness and inspire action*, and develop different personal and collective frameworks about possibilities, purpose, cooperation, resilience, and collective responsibilities.
- *Transforming business practices to promote ecosystem health and social wellbeing*.
- *Facilitating collaborations* by partnering with marginalized populations to understand priorities and needs, and collaboratively address historic and current inequities.
- *Designing new technological possibilities* that can contribute to efficiency, decarbonization of energy, production, and transport, and move toward zero carbon, zero waste, and circular systems. Beyond individual technologies, we can reimagine and redesign our global built environment.
- *Enhancing and maintaining personal and societal resilience* through identifying strategies for sustaining the well-being of people and communities amid ongoing disruption.
- *Exploring future scenarios*: interpreting our empirical understanding of trends, uncertainties, and possibilities inform our actions, and assessing what changes are locked-in vs. able to be influenced.

Conclusion

This fluency framework provides the various learning communities across Duke University with a shared orientation to understand and respond to the challenges of a rapidly escalating planetary crisis. The hope is to empower members of our university community to become effective change agents, inspired and to prepared to build a future that provides for the wellbeing of all while sustaining the biophysical health of our ecosystems.

⁹ The ordering of this list does not imply a relative importance or priority of any particular pathway.