"If only they knew more about the issue, they would act!” Have you said that to yourself or your environmental education colleagues before? Looking at an issue like climate change, we see that a wealth of information and a high level of issue awareness among the U.S. public have not led to the kind of action needed to reduce climate threats to human and natural systems. Americans’ climate change concern still ranks lower than their concern for other environmental problems like water supply and pollution, as well as lower than their concern for health care and the economy. Climate change concern has, however, increased significantly since 2015.¹ Yet these high levels of awareness and growing concern mask the range of opinions that environmental educators might encounter at a local level, as well as the emergence of climate change as a highly politicized issue in U.S. politics.² Although climate change remains a challenging topic for environmental educators, environmental education is an important player in fostering positive climate change dialogue and subsequent climate change action.³

Environmental education programs, organizations, and online resources related to climate change abound in formal, nonformal, and informal settings.⁴ The Climate Literacy and Energy Awareness Network (CLEAN) boasts a collection of over six hundred climate change education resources reviewed by scientists and educators that range from activities to demonstrations, visualizations, and videos curated from around the Internet. National environmental education training programs like Project Learning Tree focus their attention on climate change, with a module for secondary education called Southeastern Forests and Climate Change.⁵ The National Network for Ocean and Climate Change
Interpretation (NNOCCI) has trained over 150 educators in thirty-eight states in research-based techniques for engaging audiences with climate change. And the Planet Stewards program of the National Oceanographic and Atmospheric Administration (NOAA) offers face-to-face training for educators, as well as a webinar series on climate change science and education. As interest from environmental educators has grown, so has research on developing effective climate change programs, particularly in formal education settings.6

Yet the question remains: How do we optimize programs for attaining climate literacy and action to address mitigation of greenhouse gas emissions, and, when necessary, adaptation to changes already taking place? A review of climate change education literature focused on education in formal settings found that making climate change “personally relevant and meaningful,” and engaging learners through inquiry and constructivist learning, correlated with a program’s success in increasing climate science understanding, shifting climate change attitudes, and inspiring action.7 Research from environmental psychology and climate change communication offers useful, tangible insights into designing climate change education programs that are personally relevant and meaningful.8 For example, environmental psychology informs climate change communication research on framing and metaphors, and it can also directly inform how educators think about and assess their audiences (figure i.1). Similarly, climate change communication research on framing can inform environmental educators’ strategic choice of program language. Training programs like NNOCCI have adopted evidence-based methods drawn from climate change communication and environmental psychology, and educators who participate in this program adopt research-based practices and value a research-based approach.9

![FIGURE i.1](image-url) How environmental psychology research and climate change communication research can inform climate change education practice
Climate change education and climate change communication share similar goals and desired outcomes, and their definitions reflect these similarities. Climate change education, or climate change environmental education, encompasses a range of “interdisciplinary learning opportunities that people of all ages need to develop the competencies, dispositions and knowledge to address climate change.” It approaches climate change with an “understanding of the socio-political and economic considerations; the scientific basis; and the communication, collaborative problem-solving and analytical skills needed to generate and implement feasible solutions.”10 According to the Yale Program on Climate Change Communication, climate change communication is “about educating, informing, warning, persuading, mobilizing and solving this critical problem. At a deeper level, climate change communication is shaped by our different experiences, mental and cultural models, and underlying values and worldviews.”11 The first part of this definition speaks to goals held in common between climate change communication and environmental education, like climate literacy and action, while the second part touches on linkages between climate change communication and environmental psychology.

This book seeks to provide environmental educators with an understanding of how their audiences engage with climate change information, as well as with concrete, empirically tested communication tools they can use to enhance their climate change programs. We define “environmental educator” broadly, to mean people “focused on using best practice in education . . . to address the social and environmental issues facing society.”12 We focus primarily on the first three steps of developing a climate change education program (figure i.2): identifying climate change education outcomes and resources, assessing audiences, and strategizing programs. Part 1 of this book provides overviews of climate change science, climate change attitudes and knowledge, and climate change education outcomes. It also introduces three vignettes referenced throughout the chapters describing how fictional educators address climate change education challenges. Part 2 explores how psychology research explains the complex ways in which people interact with climate change information; this research is useful in informing educators’ audience assessment. Part 3 presents communication strategies with a focus on research about framing, metaphors, and messengers that can help educators formulate program language. At the end of parts 2 and 3, we summarize the research with an eye toward applications to environmental education. Finally, part 4, “Stories from the Field,” highlights four educators’ climate change education programs and illustrates connections between their teaching strategies and the research covered in parts 2 and 3.
INTRODUCTION

Bottom Line for Educators

The complexity of climate science combined with the complicated political and cultural contexts in which people live makes climate change a particularly challenging topic to approach no matter the educational setting. This book introduces environmental psychology and climate change communication research that can assist environmental educators at several program development stages. Of course, educators also need a foundation in climate change science, which is where we turn next.

FIGURE i.2 Program development cycle

Adapted from Susan Jacobson, Communication Skills for Conservation Professionals, 2nd ed. (Washington: Island Press, 2009), 50–51