Planetary Health Curriculum Guidelines

PLANETARY HEALTH ALLIANCE

Planetary Health Curriculum Guidelines | Volume 1 (2026)

This document was prepared by the Planetary Health Alliance's Roadmap Education Working Group – Education Curriculum Committee.

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Planetary Health Curriculum Guidelines

Planetary Health is a universal, inclusive, and value-centered approach that seeks to integrate ecological sustainability, social equity, and human well-being across all systems.

—Planetary Health Roadmap and Action Plan (2024)

Acknowledgments

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Foreword

In accordance with the Planetary Health Roadmap and Action Plan, the Planetary Health Alliance's (PHA) Education Curriculum Committee convened between November 2024 and September 2025 to create a curriculum aligned with the Roadmap's Guidance on Engaging the Education Sector in Revolutionizing Approaches to Education. This process sought to design guidance for universal, inclusive, and value-centered Planetary Health curriculum that reflects the urgent need for transformational education across the lifespan.

The committee emphasized the development and integration of a comprehensive framework for lifelong learning and professional development, drawing on key documents such as the São Paulo Declaration on Planetary Health, the Planetary Health Education Framework (PHEF), and the Roadmap itself. The guiding vision was to advance Planetary Health literacy while embedding principles of nature-connected learning, ethics, conservation, biodiversity protections, deep adaptation, post-growth economics, solutionary thinking, and collective health for all beings, now and in the future. At the heart of this vision was a commitment to transdisciplinary collaboration and equity, affirming that all people should have meaningful opportunities to help shape the systemic transformations required for a flourishing future rooted in health and sustainability, with no community, discipline, or sector left behind.

We hope that this curriculum guidance helps teachers shape their own locally informed Planetary Health educational offerings.

The Planetary Health Education Curriculum Committee Editors


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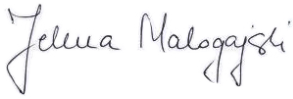
Jelena Malogajski

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Section 1: Introduction and Background

1. Introduction

In 2015, The Rockefeller Foundation–Lancet Commission on Planetary Health defined Planetary Health as "the achievement of the highest attainable standard of health, well-being, and equity worldwide through judicious attention to human systems—political, economic, and social—that shape the future of humanity and the Earth's natural systems that define the safe environmental limits within which humanity flourish. Put simply, planetary health is the health of human civilisation and the state of the natural systems on which it depends" (Whitmee et al., 2015, p. 1978; Horton, et al., 2014). This report laid the foundation for the movement and the emerging field of Planetary Health.

The *São Paulo Declaration on Planetary Health* followed soon thereafter. It was co-created by various stakeholders in 2021 during the Planetary Health Alliance (PHA) annual meeting in São Paulo, Brazil. The declaration called on the global community to chart a path toward a more resilient and equitable post-pandemic world (Myers et al., 2021; PHA, 2021). Through this consultation, the definition of Planetary Health was expanded, with PHA now describing it as "*a solutions-oriented, transdisciplinary field and social movement focused on analyzing and addressing the impacts of human disruptions to Earth's natural systems on human health and all life on Earth*" (PHA, n.d., para. 1).

Recently, the *Planetary Health Roadmap* (PHA, 2024) clarifies that Planetary Health is a universal, inclusive, and value-centered approach that seeks to integrate ecological sustainability, social equity, and human well-being across all systems. The Roadmap emphasizes Planetary Health literacy, lifelong learning, and transdisciplinary collaboration as essential for addressing the ecological determinants of health and ensuring no community is left behind. This framing positions Planetary Health as an academic field and as a guiding framework for collective action, policy transformation, and education that equips individuals and societies to thrive within the safe operating space of Earth's systems.

> **...a solutions-oriented, transdisciplinary field and social movement focused on analyzing and addressing the impacts of human disruptions to Earth's natural systems on human health and all life on Earth.**

Resources for Educators on Planetary Health

Safeguarding human health in the Anthropocene epoch – The Rockefeller Foundation–Lancet Commission on Planetary Health

Planetary Health Alliance

Safeguarding human health in the Anthropocene epoch – The Rockefeller–*Lancet* Commission on Planetary Health

The trajectory of the Anthropocene: The Great Acceleration – Steffen, W., et al.

Planetary Health: From the Wellspring of Holistic Medicine to Personal and Public Health Imperative – Prescott, S., & Logan, A.

The Canmore Declaration: Statement of Principles for Planetary Health – Prescott, S., et al.

Earth beyond six of nine planetary boundaries – Richardson, K., et al.

Public Health, One Health, and Planetary Health: what is next? – Olea-Popelka, F., et al.

Public health guide to field developments linking ecosystems, environments and health in the Anthropocene – Buse, C., et al.

Global Change and Public Health: Addressing the Ecological Determinants of Health – Canadian Public Health Association

Planetary Health: The Future is Now – Planetary Health Alliance

Project Earthrise – The Nova Institute for Health

Planetary Health: Protecting Nature to Protect Ourselves – Myers, S., & Frumkin, H.

What is Planetary Health? – The Lancet Planetary Health

10 years to transform the future of humanity – or destabilize the planet – Johan Rockstrom

Medical Clinics for Planetary Health: The Surprising Link Between Logging and Healthcare in Indonesia – Planetary Health Alliance

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2. Background on the Planetary Health Crisis

Climate change, pollution, and biodiversity loss are among three pressing issues threatening humanity, according to the United Nations Framework Convention on Climate Change (UNFCCC) (2022, para. 1). These interlinked challenges are collectively referred to as the *triple planetary crisis*.

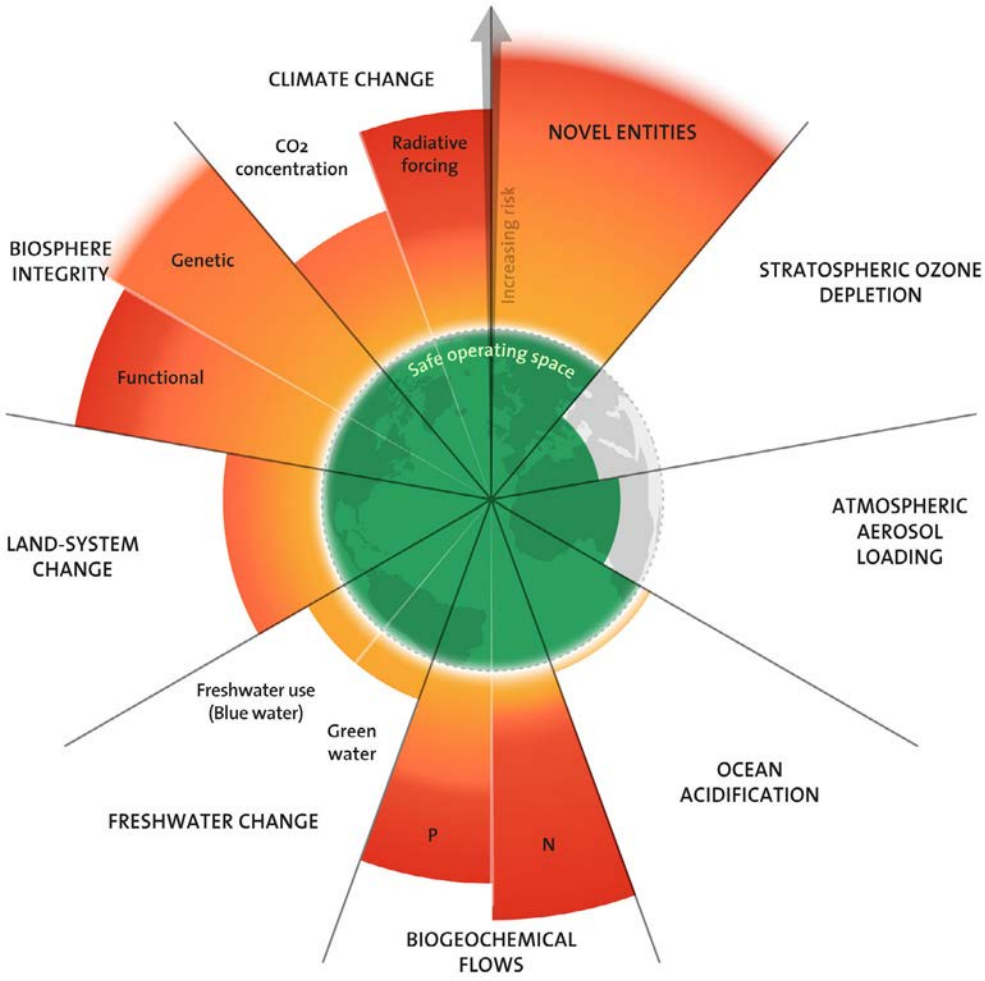
The ongoing climatic shifts in weather patterns and temperatures are significantly altering the ecosystems that sustain life on Earth—and human activities are the primary drivers of these changes. Although nearly all human activity contributes to emissions, the largest sources of greenhouse gas releases are energy production, over consumption, industrial processes, transportation, construction and building operations, and agricultural systems (Intergovernmental Panel on Climate Change [IPCC], 2023).

Beyond its environmental consequences, air pollution is a leading environmental cause of premature death and disease worldwide (World Health Organization [WHO], 2021). Climate change, land use changes, environmental pollution, and human disregard for nature also accelerate biodiversity loss, or the decline or disappearance of species, ecosystems, and ecological processes. This further threatens the resilience of the Earth's life-support systems.

Recent reports highlight that biodiversity loss is occurring at unprecedented rates, with one million species at risk of extinction (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [IPBES], 2019). The 2024 IPBES Nexus Assessment further emphasized the interdependence of biodiversity, food, water, health, and climate, noting that sustainable futures require integrated responses across these domains.

The concept of planetary boundaries developed by the Stockholm Resilience Centre, provides a clear framework for illustrating how natural systems work and interact—and how their disruption threatens both ecological and human health. For educators, this is an important entry point: teaching planetary boundaries helps learners see that protecting ecosystem well-being is directly linked to safeguarding human health and survival.

> **If the planet doesn't work, we will not be able to live on it.**



The 2025 update to the Planetary boundaries. Image: Azote for Stockholm Resilience Centre, based on analysis in Sakschewski and Caesar et al. 2025.

As the Stockholm Resilience Center has emphasized, humanity is operating within interconnected planetary boundaries, and transgressing these limits destabilizes the safe operating space for human societies (Rockström et al., 2009; Steffen et al., 2015; Richardson, Steffen, et al., 2023). Educators are therefore uniquely positioned to foster the competencies that future leaders, practitioners, and citizens will require to build resilience, mitigate risks, and advance planetary stewardship.

“If the planet doesn’t work, we will not be able to live on it.” (Stockholm Resilience Center, n.d.)

Resources for Educators to Introduce the Planetary Health Crisis

Stockholm Resilience Centre

Anthropocene Dynamics News – Stockholm Resilience Centre

"If the Planet doesn't work, we will not be able to live on it" – Stockholm Resilience Centre

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3. Overview of the Planetary Health Curriculum Guidelines

The Planetary Health Curriculum Guidelines is a collective and evolving project created by volunteers who are deeply committed to Planetary Health education and research fostering human and ecological well-being. Each chapter serves as both an invitation and a resource. Rather than a prescriptive doctrine, the document is a shared collection of innovations, ideas, values, resources, and considerations for educators working across all settings, age groups, and disciplines.

The Education Committee incorporated guidance outlined in the *São Paulo Declaration on Planetary Health*, which emphasizes the importance of embedding Planetary Health content and sensibilities across the educational continuum. For schools, this means teaching Planetary Health concepts from an early age; embedding transdisciplinary, participatory approaches into teacher preparation and classroom materials; and highlighting experiential learning strategies and activities. By fostering child-centered and nature-based pedagogies, the Declaration envisions young people not only as learners—but also as leaders who can influence families, communities, and decision-makers (PHA, 2021).

For universities and other higher education institutions, the Declaration calls for systemic change to prioritize Planetary Health scholarship, allocate resources for transdisciplinary collaboration, and align faculty promotion and research incentives with applied co-creation. It stresses that Planetary Health curricula must be embedded across all faculties, so that every student graduates with the insights, skills, and sensibilities to contribute to sustainable futures through both their personal and community engagements as well as their professional endeavors in their field of choice. Importantly, it emphasizes equity and access, ensuring participation in research, education, and advocacy across diverse populations and contexts (PHA, 2021).

The primary aim of the PHA Education Curriculum Guidance is to create and promote an inclusive, accessible, and adaptable Planetary Health curriculum that is relevant to diverse demographics and contexts. We recognize that this is an ongoing process, requiring an ever-growing community of educators. For this curriculum guidance document, we sought to:

1. **Develop and promote an inclusive Planetary Health curriculum** adaptable for all levels of education, from early childhood through higher education, professional development, and community learning. This includes ensuring accessibility across cultural and socioeconomic contexts, gathering resources in multiple languages, and integrating local and Indigenous knowledge systems through partnerships with regional champions.

2. **Tailor curriculum to build students' knowledge, skills, values, and attitudes** around Planetary Health, with the goal of evaluating curricular effectiveness and impact. This framework is in continuous development and envisioned as a tool for educators and institutions to assess outcomes consistently.
3. **Provide adaptable educator resources and guidelines** that can be modified for local contexts while equipping young people with the research and media literacy skills necessary to explore Planetary Health issues within their own communities. This includes the ability to communicate findings to diverse audiences effectively.
4. **Create opportunities for child-centered and empowering education**, including the use of student-centered research methodologies to monitor effectiveness and tailor curricula to the needs and capacities of children.

In sum, the Committee's work sought to operationalize the global aspirations articulated in the *São Paulo Declaration* (2021) and *Planetary Health Roadmap* (2024) by crafting practical, adaptable curricular guidance. This work reflects a recognition that Planetary Health education is about more than simply sharing knowledge; it is also about cultivating the capacity, values, and agency needed across generations to transform health and societal systems in the face of planetary crises. This work seeks input and collaboration from educators worldwide. We invite all those engaged in teaching Planetary Health to join this volunteer collective and help ensure that curricular materials remain adaptable and relevant across cultural and socioeconomic contexts. An important dimension of this effort will be the intentional gathering of resources in multiple languages and from diverse cultures, with particular emphasis on the integration of local and Indigenous knowledge and the leadership of local partners and decision-makers.

Another priority of the Committee's work is to identify strategies and opportunities for child-centered and empowering education. We are committed to exploring child-centered research methodologies that can help monitor and evaluate the effectiveness of Planetary Health education initiatives for children and youth. These approaches ensure that young people are active learners, contributors, and leaders in Planetary Health transformation.

Finally, this collaboration is intended to remain open, accessible, and generative. The content of this document is free to use with appropriate citation. We kindly request that users credit this source, and we welcome adjustments, additions, and innovations.

Educators interested in sharing contributions or joining this effort are invited to **connect with the PHA Education Program Director, jelena.malogajski@jhu.edu.**

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4. Planetary Health Education Framework

The Planetary Health Education Framework (PHEF) was developed by PHA and global collaborators to provide educators with a structured way to integrate Planetary Health concepts into curricula across disciplines, cultures, and higher education (Faerron Guzmán et al., 2021). The framework is designed to prepare learners to understand and respond to the complex and interconnected challenges that arise from human disruptions of Earth's natural systems, including climate change, biodiversity loss, pollution, and unsustainable resource use. The Planetary Health Curriculum Guidelines builds on and draws from the PHEF.

The five core domains of the PHEF outline values and pedagogical approaches that support transformative learning. They include Interconnection Within Nature, the Anthropocene and Health, Equity and Social Justice, Systems Thinking and Complexity, and Movement Building and Systems Change. The domains emphasize the integration of scientific knowledge with Indigenous Knowledge Systems, wisdom traditions, systems thinking, ethical reflection, and experiential learning. The framework also recognizes the importance of interconnection between human health, ecological systems, and cultural contexts and encourages learners to cultivate a sense of responsibility toward sustaining life on Earth.

While the five core domains are not linear, all the other domains depend on a strong understanding of Interconnection Within Nature. The belief that humans are exceptional, separate from, and better than the rest of Nature is the primary driver of human-caused disruptions of the Earth's natural systems.

The PHEF is not meant to be a prescriptive curriculum but rather a flexible guide that can be adapted across disciplines and tailored to regional needs. The framework offers a shared global language that supports transdisciplinary learning and communication. Its goal is to build capacity among educators and students to foster the competencies required for leadership, advocacy, and action in Planetary Health. You can explore the full framework on PHA's website.

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5. Human Health Science

Understanding Planetary Health requires a foundational grasp of human health science. Traditionally, human health is taught through an introduction to the role of the body's organ systems and how they work together to keep us alive, balanced, and able to develop and heal (Betts et al., 2022).

When teaching non-health professionals or children, it helps to emphasize that no system works alone. Health emerges from cooperation, communication, and care within the body and between the body and the world it lives in. Human body systems function as an integrated, adaptive network, linking the nervous, endocrine, immune, cardiovascular, renal, digestive, and respiratory systems to sense, interpret, and respond to environmental conditions such as air quality, temperature, water availability, nutrition, and stress (Bohme et al., 2022).

Access to sufficient water, sanitation, hygiene, a stable climate, clean air, and a protected natural environment are all necessary for good health (WHO, 2024a). As environmental degradation threatens these factors, it is paramount to ensure students across every educational level understand the science that impacts human health.

Human health literacy improves when connected to lived experiences. Cities experiencing poor air quality way above the limit set by the WHO demonstrate how poor atmospheric conditions can affect cardiovascular and respiratory systems, thereby increasing the appearance of diseases such as asthma, cancer, stroke, and bronchitis (WHO, 2021). Extreme heat has also been reported as the leading cause of weather-related deaths, particularly among older adults and outdoor workers (WHO, 2024b). These examples further confirm the Planetary Health concept that protecting the environment is inseparable from our health.

Therefore, teaching human health science in Planetary Health education should promote systems thinking and environmental responsibility, ensuring that learners acknowledge the significance of protecting both their body's physiology and the systems that sustain its good health.

Health emerges from cooperation, communication, and care within the body and between the body and the world it lives in.

Resources for Educators on Human Health Sciences

Heat and Health Impacts (2022 Heatwave Report) – European Environment Agency

Climate Change 2022: Impacts, Adaptation, and Vulnerability – Intergovernmental Panel on Climate Change

Lancet Countdown: Tracking Progress on Health and Climate Change – The Lancet Countdown

Bookshelf – National Center for Biotechnology Information, National Library of Medicine Health and Biomedical Science

Planetary Health Education – Planetary Health Alliance

Water, Sanitation, (WASH) – UNICEF

Air Pollution and Health – World Health Organization

Heat and Health – World Health Organization

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Section 2: Health Impacts of Environmental Changes

6. Introduction

Global environmental change is reshaping the foundations of human health, driving a wide range of impacts from direct injuries and displacement to infectious disease, chronic illness, malnutrition, and mental health challenges. These effects are interconnected and disproportionately borne by vulnerable populations, magnifying existing inequities. Understanding the breadth of these health consequences is essential for developing effective strategies to protect communities and foster resilience in a rapidly changing world.

To provide a sense of the different dimensions of the health crisis, and how closely human health is tied to the violation of Earth's natural systems and transgression of the planetary boundaries, this chapter pulls together a non-exhaustive list of environmental changes' health impacts meant to help educators frame this conversation (Kemarau et al., 2024).

In addition to including the direct health impacts, this chapter discusses the cascading effects of displacement and conflict driven by environmental degradation. This is a powerful example of how ecological change translates into social and humanitarian crises with profound health consequences. Environmental stresses—such as flooding, drought, and rising sea levels—drive mass displacement and threaten entire communities. Displacement, in turn, intensifies pressure on food, water, and land, often sparking competition and conflict in host regions. Conflict and instability magnify vulnerability to environmental hazards, creating a cycle of compounded risk. At every stage, health impacts escalate through the spread of infectious diseases, rising malnutrition, noncommunicable diseases, physical trauma, and widespread mental distress. This shows that the planetary crisis is not only about challenged ecosystems, but about destabilizing societies in ways that reverberate directly through human health. Educator resources for the following content areas can be found on the PHA Website.

Note: Some of this information was sourced from prior PHA writing on Planetary Health impacts, available on the PHA website.

> **Environmental stresses—such as flooding, drought, and rising sea levels—drive mass displacement and threaten entire communities.**

7. Direct and Traumatic Injuries

Direct and traumatic injuries include medical conditions such as burns, broken bones, head injuries, and wounds. Climate change—driven by industrial and agricultural practices resulting in greenhouse gas emissions, deforestation, and ecosystem destruction—has been linked to more intense hurricanes, floods, and wildfires, which cause injuries and deaths. Deforestation and land-use changes further exacerbate the risk of hazards, such as landslides (Fidan et al., 2024). In Indonesia, for example, deforestation and mining have intensified landslides, leading to significant casualties (Reuters, 2024). These hazards are worsened by the loss of natural buffers, including forests and wetlands, which historically mitigated such risks by absorbing excess rainfall and stabilizing soil.

Communities in urban areas with inadequate infrastructure and preparedness are particularly vulnerable (UN-Habitat, 2024). Poorly constructed buildings, insufficient drainage systems, and lack of disaster readiness amplify the impact of environmental crises, leading to higher injury and death rates. This disparity is particularly evident in low-income communities, which often face greater exposure to physical harm during extreme weather events, and further reinforced by weak health system infrastructure or a lack of capacity within the health sector. Heat-related fatigue can impact workers' alertness to job-related dangers, which can increase the chance of injury or death due to safety lapses (Lin et al., 2023).

Addressing the link between environmental degradation and physical trauma requires restoring natural ecosystems and strengthening disaster preparedness (UN Environment Programme [UNEP], 2024). Integrating sustainable land management practices, improving urban infrastructure, and protecting natural barriers can reduce the burden of trauma and injury while enhancing community resilience.

> **Poorly constructed buildings, insufficient drainage systems, and lack of disaster readiness amplify the impact of environmental crises, leading to higher injury and death rates.**

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8. Mental Health

In addition to physical injury, the mental health effects of the global environmental crisis are well established across multiple domains. While climate change is one contributing factor to mental health issues (Connecting Climate Minds, 2024), the psychological burden extends far beyond temperature rise and extreme weather. Biodiversity loss, deforestation, toxic pollution, soil degradation, and worsening air quality also contribute to anxiety, grief, fear, and despair (Cunsolo & Ellis, 2018). Researchers describe forms of grief linked to experienced or anticipated ecological losses, species extinction, and landscape transformation, including those driven by both acute and chronic environmental change (Cunsolo & Ellis, 2018). This is sometimes called solastaglia.

Mental health research now clearly links a wide spectrum of psychological consequences to climate-related events, including post-traumatic stress disorder, major depressive disorder, anxiety, depression, post-partum depression, increased substance use, and in some cases, suicide ideation (Hayes et al., 2018; Niedzwiecki, 2020; Lawrence et al., 2022). Heat exposure has also been linked increased suicide risk (Burke et al., 2018).

Wildfire smoke (Eismann & Galway, 2022) and other forms of air pollution, along with degraded urban environments, have similarly been associated with psychological distress, uncertainty, and poorer well-being (Newbury et al., 2024). WHO recognizes climate- and environment-related mental health impacts as an emerging global public health priority. Finally, it is important to note that these mental health harms are not shared equally (Rudolph et al, 2023). Certain groups, such as Indigenous Peoples, people with lower incomes, children, older adults, and individuals living with disabilities or long-term health conditions tend to face a greater level of risk and burden than the general population.

“Researchers describe forms of grief linked to experienced or anticipated ecological losses, species extinction, and landscape transformation, including those driven by both acute and chronic environmental change.”

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9. Displacement and Conflict

Environmental degradation—such as desertification, deforestation, and rising sea levels—continually contributes to the growing population of climate refugees and internally displaced persons. In the past decade, weather-related events drove an average of 21.5 million people from their homes each year, surpassing displacements caused by conflict and violence by more than twofold (UNHCR, n.d.).

Rising sea levels threaten the existence of small island states, while water shortages and agricultural collapse in arid areas contribute to increased migration (Doorga et al., 2024; IPCC, 2022). These population movements, both within and across borders, often place immense pressure on resources in destination regions, leading to competition for essentials such as food, water, and land, which can escalate into conflicts over resources and civil unrest (Rigaud, 2018).

A recent UNHCR report (2024) highlights that individuals fleeing war, violence, and persecution are increasingly vulnerable to the global climate crisis and other forms of environmental degradation. These overlapping challenges place them in a precarious position, facing compounded threats while lacking adequate funding and resources for adaptation.

Seventeen countries have been identified by the International Rescue Committee (2024) as enduring brutal conflicts while being on the front lines of a global climate crisis they did not create.

Displacement caused by environmental crises and conflict is strongly associated with increased risks of infectious disease outbreaks (Marou at al., 2024), malnutrition, and both physical and mental trauma. Overcrowded and unsanitary conditions in displacement camps, coupled with limited access to healthcare and clean water, create ideal conditions for the spread of diseases such as cholera and respiratory infections (WHO, 2022). Malnutrition often becomes more severe among displaced populations due to disrupted food systems and insufficient aid supplies (Gooding et al. 2024; Caroll et al., 2017; WHO, n.d.). Addressing these challenges requires urgent global collaboration and evidence-based policies to mitigate the profound human toll of forced displacement.

Seventeen countries have been identified by the International Rescue Committee (2024) as enduring brutal conflicts while being on the front lines of a global climate crisis they did not create.

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10. Infectious Diseases

The rise of infectious diseases in recent decades (De Gaetano et al., 2025) is exacerbated by global anthropogenic environmental changes, which are deeply intertwined with socioeconomic and ecological factors. Biodiversity loss, climate change, chemical pollution, and the introduction of non-native species are linked to increases in infectious disease-related outcomes (Mahon et al., 2024).

Climate change, combined with global mobility and urbanization, is significantly influencing the distribution of vector-borne, food-borne, and waterborne diseases (Anikeeva, 2024). For instance, dengue virus infections have doubled every decade since 1990, and other mosquito-borne diseases such as chikungunya and Zika experienced similar trends (Sharp et al., 2017). Shifts in human activity—such as urban expansion, infrastructure development, and agriculture—serve as key predictors for the occurrence of these vector-borne diseases. Notably, the distribution of malaria-carrying mosquitoes has shifted substantially. Anopheles mosquitoes expanded their range over the past century, moving over 500 kilometers southward and 700 meters up in altitude, driven by changes in rainfall, temperature, and humidity (Carlson et al., 2023).

Deforestation has also been linked to an increase in the spread of mosquito-borne diseases. Warm, partially shaded pools that form beside roads seeping into forests, and puddles behind debris where water is no longer absorbed by trees, provide optimal breeding grounds for these mosquitoes (Ferraguti et al., 2023; Robbins, 2016).

Bacterial infections are also becoming more prevalent due to climate change, deforestation, and pollution. Vibrio bacteria, which are found in coastal waters, are thriving under conditions shaped by rising sea temperatures and altered salinity levels (Romanello et al., 2021). These bacteria can cause severe illnesses, ranging from gastroenteritis to life-threatening cholera and sepsis.

Addressing these challenges requires comprehensive strategies that tackle their root causes. Reducing greenhouse gas emissions and maintaining healthy ecosystems will all limit the spread of invasive species.

> **Biodiversity loss, climate change, chemical pollution, and the introduction of non-native species are linked to increases in infectious disease-related outcomes.**

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11. Life Stages and Reproductive Health

The global environmental crisis profoundly affects individuals across all life stages, with environmental degradation and climate-related disruptions posing significant health risks. Children, mothers, and elders are among the most vulnerable populations (Ngcamu, 2023). During pregnancy, environmental hazards such as extreme heat, air pollution, and water scarcity increase the likelihood of adverse outcomes, including preterm birth, low birth weight, and maternal complications (Papadiochou et al., 2024). Research has linked high temperatures and exposure to air pollution to a greater risk of preterm birth and low birth weight (Bekkar et al., 2020; Ha, 2022; Baharav et al., 2023).

Children exposed to degraded environments face elevated risks of respiratory illnesses, malnutrition, and developmental delays due to poor air and water quality. WHO reports that environmental risks significantly contribute to childhood diseases, with air pollution leading to respiratory infections and inadequate water quality causing diarrheal diseases, both of which can impair development (WHO, n.d.). Additionally, malnutrition adversely affects lung development and function in children, increasing susceptibility to respiratory conditions (Tharumakunarajah et al., 2024).

Older adults are particularly vulnerable during environmental crises, as extreme weather events and resource shortages often exacerbate chronic health conditions and limit access to essential healthcare. For example, extreme heat aggravates cardiovascular and respiratory diseases, resulting in increased hospitalizations and mortality among older populations (NIH, 2023).

Furthermore, natural hazards disrupt healthcare services (Shin & Ji, 2021), making it difficult for vulnerable groups—such as elderly individuals, pregnant people, and children—to obtain necessary medical care and medications, worsening their health challenges during such crises (National Institute on Aging, 2022).

Emerging research has also revealed that exposure to environmental toxins can trigger epigenetic changes with trans-generational effects, increasing health vulnerabilities across generations. These environmental stressors can induce heritable epigenetic alterations, which may heighten disease susceptibility and impact health outcomes in future generations (Klibaner-Schiff et al., 2024; Skinner, 2014).

Extreme weather events and resource shortages often exacerbate chronic health conditions and limit access to essential healthcare.

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12. Noncommunicable Diseases

Noncommunicable diseases (NCDs) are responsible for approximately 41 million deaths, or 74% of all global deaths, annually, making their prevention and management critical public health priorities (Bennett et al., 2025; Vos et al., 2020). Global environmental changes such as climate change, biodiversity loss, freshwater depletion, deforestation, overfishing, ocean acidification, and soil degradation increase the prevalence and severity of NCDs (Dhimal et al., 2021)

Air pollution, primarily from fossil fuel combustion, is a significant driver of global morbidity and mortality, contributing to around one in six deaths annually worldwide (Vos et al., 2020; Fuller et al., 2022). In urban and densely populated areas especially, long-term exposure to air pollution is linked to reduced lung function, asthma, and chronic obstructive pulmonary disease (Frumkin & Haines, 2019).

Rising temperatures and more frequent extreme weather events—such as cyclones, floods, and storms—also exacerbate health risks for individuals with chronic diseases. A systematic review of 152 studies found that extreme weather events are associated with increased mortality from stroke, ischaemic heart disease, and respiratory conditions as well as mental health issues (Bernhardt & Roy, 2024; Ryan et al., 2015).

Increased heat exposure due to climate change is associated with higher mortality rates, more emergency department visits, and increased hospital admissions for cardiovascular, respiratory, and kidney-related conditions (Frumkin & Haines, 2019). Additionally, climate change affects NCD risk through pathways linked to food and nutrition, further compounding the public health challenge, as will be covered in the chapter on nutritional diseases.

> **A systematic review of 152 studies found that extreme weather events are associated with increased mortality from stroke, ischaemic heart disease, and respiratory conditions as well as mental health issues.**

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13. Nutritional Diseases

The degradation of Earth's natural systems, combined with anthropogenic greenhouse emissions, poses a critical threat to global food systems. Beyond the climate-induced impacts on the quantity of crop yields, elevated carbon dioxide (CO2) levels directly affect the nutritional value of staple crops (Smith & Myers, 2018). As of 2023, the globally averaged CO2 concentration reached 420 parts per million (ppm), with projections suggesting levels could exceed 550 ppm by mid-century (World Meteorological Organization, 2024). This increase could lead to approximately 175 million people becoming zinc deficient, 122 million people facing protein deficiencies, and nearly 1.4 billion children under five and women of childbearing age living in regions at the highest risk of iron deficiency-induced anemia (Smith & Myers, 2018). Vulnerable populations, especially in low-income regions, face a heightened risk of multiple nutrient deficiencies due to insufficient food stocks, nutrient-poor food, or a combination of both these risk factors.

Deforestation, soil erosion, biodiversity loss, and pollution further undermine the planet's ability to support and produce food sustainably (FAO, 2021). Climate instability exacerbates these challenges, with extreme weather events, shifting rainfall patterns, and rising temperatures disrupting agricultural yields and destabilizing growing seasons (IPCC, 2022). Meanwhile, the depletion of vital resources—such as freshwater and fertile soil—and declines in pollinator populations due to habitat loss and pesticide use jeopardize crops critical for food production (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2020; IPBES, 2016).

These interconnected issues collectively compromise food availability, access, and nutritional quality, intensifying the risk of hunger and malnutrition for billions, particularly in low-income communities reliant on subsistence farming (UN, 2023).

Addressing these challenges demands urgent, coordinated efforts to restore and protect Earth's natural systems while fostering sustainable and resilient food systems. Planetary Boundaries and Planetary Health frameworks are intrinsically linked: the boundaries framework defines the safe operating limits of Earth's systems, while the health framework highlights how crossing those limits threatens human health and well-being (Myers et al., 2025). It is important to note that the health impacts often appear well before a boundary is fully crossed.

Deforestation, soil erosion, biodiversity loss, and pollution further undermine the planet's ability to support and produce food sustainably.

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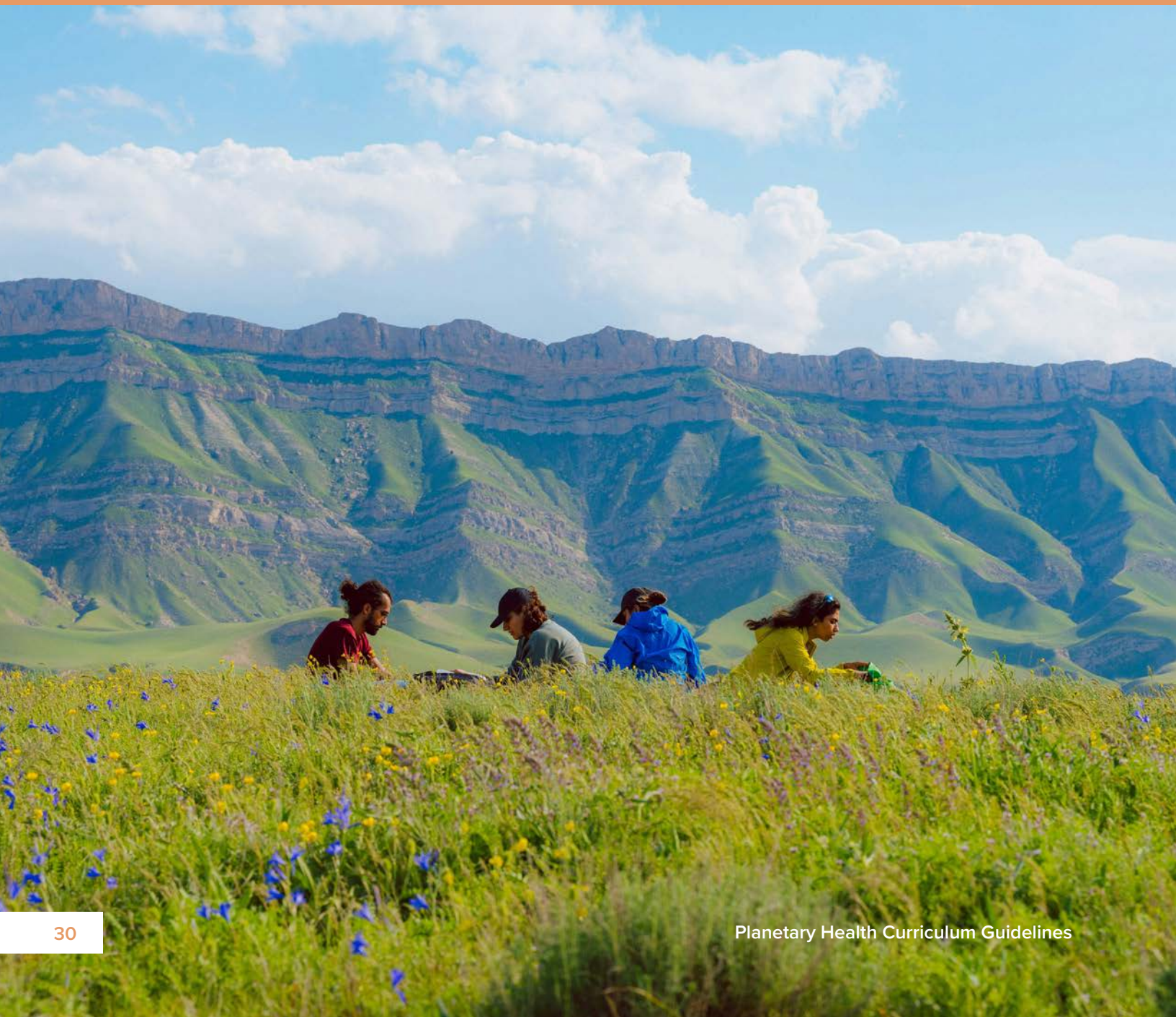
Section 3: Pedagogies of Planetary Health



14. Introduction

Planetary Health shares similarities with other human-animal-environment models such as global health, EcoHealth, and One Health; however, it is unique in the scale of its holistic, transdisciplinary inclusion and its movement to transform systems, making it a necessary paradigm to consider. Planetary Health's scope allows us to analyze and address the social, structural, and ecological determinants of health (Ruiz de Castañeda et al., 2023).

The São Paulo Declaration on Planetary Health (Myers et al., 2021) states:

We need a fundamental shift in how we live on Earth, what we are calling the Great Transition. Achieving the Great Transition will require rapid and deep structural changes across most dimensions of human activity. This includes how we produce and consume food, energy, and manufactured goods; how we construct and live in our cities; and how we consider and measure growth, progress and development, and govern ourselves. It will also require rethinking our values and relationship within Nature and to each other from human exceptionalism, domination, and scarcity to interdependence, equity, and regeneration (p. 2).

Planetary Health is the only movement inclusive enough to transform human systems at the pace and scope that are necessary.

Planetary Health is a transdisciplinary field that creates a safe space for diverse disciplines and people to come together and not only share ideas but create something new at the intersection of our ways of knowing (PHA, n.d.-a).

Planetary Health is also a social movement that builds networks and coalitions to scale effective solutions and transform systems to restore Planetary Health. It promotes effective strategies and actions to address the upstream underlying drivers and the downstream modifying factors that determine health for all humans and nonhumans (PHA, n.d.-b).

Planetary Health pedagogy ensures that these critical linkages are explicitly taught, equipping learners with the competencies and ethical frameworks needed to address complex challenges (Redvers et al., 2023). Planetary Health challenges sectors to collaborate across disciplines, integrate equity into decision-making, and build resilience against the accelerating environmental changes of our time.

We need a fundamental shift in how we live on Earth, what we are calling the Great Transition.

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15. Teaching and Learning Approaches in Planetary Health

The guiding principles for Planetary Health education reflect a holistic approach, where education is not limited to knowledge transmission but cultivates deeper understandings of interdependence, equity, reciprocity, and care for all life among students. Educators are called to nurture awareness, responsibility, and imagination in ways that allow students to see themselves as part of a shared community.

The São Paulo Declaration on Planetary Health emphasizes that achieving the Great Transition requires structural change in how we produce, consume, build, and measure progress. The PHEF identifies core domains of knowledge, practice, and advocacy that every learner should have the opportunity to explore and consider. The Planetary Health Roadmap provides a direction for coordinated action across sectors and disciplines and helps learners see how people are navigating.

Child-centered education, which is covered in more detail in the following chapter, is vital to Planetary Health. Child-centered education environments create space for learners to engage deeply, while child-centered research methodologies allow educators to monitor and adapt approaches to ensure that Planetary Health education is effective and responsive.

Locally relevant storytelling can help learners situate Planetary Health challenges and possibilities within their own lives and communities. Storytelling also strengthens students' systems thinking and listening and communication skills, and this promotes connection, creativity, and community in the classroom, which can help learners move from fear toward agency. By engaging learners as active participants in creating change, classrooms become spaces where despair is transformed into possibility.

The São Paulo Declaration on Planetary Health emphasizes that achieving the Great Transition requires structural change in how we produce, consume, build, and measure progress.

Resources for Educators on Teaching and Learning Approaches in Planetary Health

Conceptual frameworks, competencies, contents, and teaching methods in planetary health education for health students and professionals: a global systematic scoping review – Carrion, C., Llamas, C. A., Safitri, E. D., et al.

Agency in the Anthropocene: Education for Planetary Health – White, P. J., Ardoin, N. M., Eames, C., & Monroe, M. C.

Co-designing planetary health education: Empowering students and enhancing educator capacity – Monash University

Curious Climate Schools Project – Curious Climate Schools Project

K-12 Education – Climate Mental Health Network

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16. Planetary Health Education for Children

Planetary Health education for children emphasizes the interconnectedness of human health, nature and animals, and Earth's ecosystems, aiming to foster awareness and action among young learners. It introduces concepts of Planetary Health tailored to the biodiversity, geographical, and environmental challenges specific to their communities. Students engage with real-world issues such as air pollution, biodiversity loss, and climate change, empowering them to understand and address local environmental concerns.

Interactive and practical pedagogies are a useful tool in this approach, including youth participatory action research and child-led research, which enable students to design and conduct their own projects. This methodology shifts the traditional teacher–student dynamic by promoting inquiry-based learning rooted in children's lived experiences. For example, students might track respiratory illnesses linked to air pollution or assess changes in biodiversity over time through intergenerational interviews. These activities build foundational research skills while fostering critical thinking and advocacy (Caraballo et al., 2017; Kim, 2016).

Educommunication training further equips students with effective communication skills to translate scientific findings into accessible narratives. Through storytelling, digital media projects, and advocacy campaigns, children learn to raise awareness and mobilize community action. Networking opportunities with peers in other countries enhance global awareness and confidence in communication, encouraging collaboration on shared Planetary Health challenges.

Illustrative examples highlight the effectiveness of this approach. Melbourne's annual Little Food Festival engages children in exploring food systems through interactive activities, demonstrating the importance of fun, hands-on learning in shaping sustainable futures. Similarly, youth participatory action research projects piloted by the Girawa Youth Clubs in Brazil and Sri Lanka integrate place-based learning into informal education settings, addressing barriers such as limited resources and large class sizes.

“Through storytelling, digital media projects, and advocacy campaigns, children learn to raise awareness and mobilize community action.”

Art-based activities—including drama, painting, drawing, rhymes, and poetry—also support children in learning and expressing their understanding of Planetary Health. These creative methods deepen emotional connections to nature and provide developmentally appropriate pathways for teaching complex issues such as climate change (Sobel, 1996; Sriprakash, 2010).

Ultimately, Planetary Health education for children seeks to empower them as active participants in environmental education. It equips young learners with the knowledge, skills, values, and attitudes needed to advocate for systemic change both locally and globally (Sterling & Orr, 2001; UNESCO, 2020).

Resources for Educators on Planetary Health Education for Children

Growing Green Hearts – Planetary Health Alliance

Girawa Youth Clubs – Girawa

Children as researchers and storytellers through film: inspired by the Little Food Researchers – Monash University

Educating Children and Teens – Planetary Health Alliance

EduCommunicate: Teaching Across Cultures – EduCommunicate

K-12 Education – Climate Mental Health Network

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17. Outcomes: Knowledge, Skills, Values, and Attitudes for Planetary Health

Planetary Health education for young people should combine knowledge, skills, values, and attitudes to build intellectual understanding, emotional resilience, ethical grounding, and practical action. For ages 11–18, learning must be accessible, engaging, and rooted in both global frameworks and local, place-based experiences. This section outlines the competencies aligned with the PHEF, with educator resources that support classroom teaching, youth projects, and community engagement.

Knowledge	Skills	Values	Attitudes
How Nature Works: Understanding how the environment— including ecosystems, biodiversity, weather, and climate—affects the health of the planet and our own health. INTERCONNECTION WITHIN NATURE	**Teamwork with Different People:** Developing capacity to work with friends; classmates; diverse groups, including local and Indigenous communities; and individuals from different disciplinary fields, such as science, health, and politics to research, report on, and solve problems related to the planet's health. COLLABORATION, PARTICIPATION, INDIGENOUS PERSPECTIVES	**Caring for Nature:** Believing that it is important to protect and take care of the environment for itself, for ourselves, and for future generations. ECOLOGICAL IDENTITY	**Compassion for Others:** Showing understanding and kindness to people, animals, and places that are affected by environmental problems. NATURE CONNECTEDNESS, HUMAN–NATURE CONNECTEDNESS, EMPATHY
Planetary Limits: Knowing the limits of how much we can safely use Earth's resources, like water and air, without harming them forever. PLANETARY BOUNDARIES	**Thinking Critically:** Learning how to analyze information to understand how different factors—such as climate change, pollution, and human activities—are connected and make good decisions about how to help the planet and protect health. COMPLEXITY AND SYSTEMS THINKING	**Fairness for All:** Valuing fairness and working to make sure that everyone, especially those most affected by climate change, has a healthy environment to live in. EQUITY AND SOCIAL JUSTICE	**Being Flexible:** Being open to change and willing to adjust to new challenges that come with climate change and other global issues. UNCERTAINTY, STRATEGIC VISIONING

Knowledge	Skills	Values	Attitudes
Health and the Environment: Learning how things like pollution, deforestation, and climate change can harm both our physical health and mental well-being, causing problems like illness, stress, and anxiety. THE ANTHROPOCENE AND HEALTH	**Speaking Up for Change:** Learning how to talk to others, including leaders and policymakers, to promote ideas that help both people and the environment. MOVEMENT BUILDING AND SYSTEMS CHANGE	**Thinking Long-Term:** Understanding the importance of making choices today that protect the environment and our health in the future. SCALE	**Curiosity and Always Learning:** Having a passion for learning more about how to protect the environment and improve health. ECOLOGICAL IDENTITY
Climate Change and Our Health: Understanding how rising temperatures and extreme weather affect allergies, diseases, stress, and other health factors. THE SOCIAL AND ENVIRONMENTAL DETERMINANTS OF HEALTH	**Big Picture Thinking**: Understanding how different things—like pollution, health, and climate—are connected and affect each other. COMPLEXITY AND SYSTEMS THINKING, GLOBALIZATION	**Responsibility for the Planet:** Feeling responsible for doing our part to keep the planet healthy and safe. ADVOCACY	**Taking Action:** Being motivated to step up and help solve problems related to the environment and health, whether through projects, campaigns, or personal choices. ADVOCACY
Global Goals for a Better Future: Deepening knowledge about global efforts, like the UN's Sustainable Development Goals, that aim to protect both people and the planet. EQUITY AND INEQUITY	**Living Sustainably**: Learning how to take care of the planet by recycling, reducing waste, and supporting eco-friendly practices such as tree planting, habitat creation and healthy eating. CAPACITY BUILDING, INNOVATION	**Respect for All Living Things:** Valuing plants, animals, and ecosystems and understanding their importance to life on Earth. ECOLOGICAL IDENTITY	**Hope for a Better Future:** Believing that even small actions can lead to big improvements for the planet and people's health. URGENCY AND HOPE
Health for All: Understanding how humans, animals, and nature are all connected and need to stay healthy together. NATURE CONNECTEDNESS, HUMAN-NATURE CONNECTEDNESS	**Talking About Health and Nature:** Being able to explain to others how the environment impacts our health in a way that is easy to understand. ADVOCACY	**Global Teamwork:** Believing in the need to work together, embracing diversity, and collaborating with people from different cultures and backgrounds around the world to solve big environmental and health issues. COLLABORATION, PARTICIPATION	**Humility:** Understanding that no one has all the answers and that it is important to listen to and learn from others when addressing problems. EPISTEMOLOGICAL DIVERSITY AND HUMILITY
Fairness and the Environment: Learning how environmental problems, like pollution and climate change, affect some people and communities more than others. EQUITY AND INEQUITY	**Creative Problem Solving:** Coming up with new, innovative ways to fix problems like pollution or climate change and make a difference. ENTREPENEURSHIP, INNOVATION	**Personal Integrity:** Acting in ways that are consistent with caring for the planet, even when it is not easy or popular, and being true to the values of sustainability and health. ECOLOGICAL IDENTITY	**Resilience:** Having the strength to keep working for positive change even when facing setbacks, including being able to bounce back and stay committed to protecting the planet. RESILIENCE

Resources for Educators on Knowledge

How Nature Works
Planetary Boundaries – Stockholm Resilience Centre

Planetary Boundaries
Planetary Boundaries Interactive Learning Tools – Stockholm Resilience Centre

Health and the Environment (The Anthropocene and Health)
The Lancet Planetary Health Journal

Climate Change and Our Health
Climate Change and Health – World Health Organization

Global Goals for a Better Future (Equity and Inequity)
Sustainable Development Goals – United Nations

Resources for Educators on Values

Caring for Nature (Ecological Identity)
Earth Charter Initiative

Fairness for All (Equity and Social Justice)
Social Determinants of Health – World Health Organization

Respect for All Living Things (Ecological Identity)

Education – Convention on Biological Diversity

Resources for Educators on Skills

Teamwork with Different People (Collaboration, Indigenous Perspectives)

Two-Eyed Seeing (Etuaptmumk) – Cape Breton University

Thinking Critically (Complexity and Systems Thinking)

Systems Thinking Resources – Donella Meadows Project

Speaking Up for Change (Movement Building and Systems Change)
Public Narrative Guide – Leading Change Network

Big Picture Thinking (Complexity and Globalization)
Directorate for Education and Skills – Organization for Economic Co-operation and Development

Creative Problem Solving (Entrepreneurship, Innovation)
Circular Economy Learning Hub – Ellen MacArthur Foundation

Resources for Educators on Attitudes

Being Flexible (Uncertainty, Strategic Visioning)
Resilience.org

Hope for a Better Future (Urgency and Hope)
Active Hope – Macy, J., & Johnstone, C.

Curiosity and Always Learning (Ecological Identity)
Children & Nature Network

Humility (Epistemological Diversity and Humility)
Futures of Education Initiative – UNESCO

18. Interprofessional and Transdisciplinary Learning Models

The complex, interconnected nature of Planetary Health—and the need for innovative solutions—necessitates hearing diverse perspectives and fostering interdisciplinary collaboration. Similarly, bringing together students from diverse fields, values, roles, and responsibilities can create opportunities for dialogue, shared inquiry, and joint problem-solving that mirror the realities of tackling global socioecological challenges. When learners engage in this way, they begin to see health, sustainability, governance, and social structures for a flourishing future as interconnected dimensions of larger systems instead of isolated issues.

Interprofessional learning highlights the importance of collaboration across health and social care professions. This approach enables students to strengthen communication skills, develop respect for multiple roles, and co-create responses to climate-related challenges, such as biodiversity loss and pollution-caused health concerns. These skills are essential as Planetary Health increasingly demands integrated approaches that link health care practices, public health, education, environmental science, advocacy and policy, research, leadership and governance, environmental stewardship, and community engagement.

Educators must intentionally incorporate Indigenous and local perspectives into teachings to generate new forms of understanding. In these learning environments, students can better analyze and situate themselves within different systems, reflecting on their responsibilities and capacities for action (White., et al., 2024). Through iterative cycles of reflection and practice, learners develop the ability to address uncertainty, complexity, and inequity in ways that are both creative and grounded (Redvers, et al., 2023).

Together, these models of education emphasize collaboration, systems thinking, and communication as central skills for Planetary Health (Potter, 2026). They foster humility and openness, inviting learners to engage with content through curiosity and a spirit of collaboration that spans scales and disciplines. By embedding these approaches in curricula, educators prepare graduates to co-produce solutions that honor multiple perspectives, foster equity, and advance the well-being of people and the planet.

> **Educators must intentionally incorporate Indigenous and local perspectives into teachings to generate new forms of understanding.**

Resources on Interprofessional and Transdisciplinary Learning Models for Educators

A Hands-On Approach to Interdisciplinary Learning – Edutopia

Middle Years Programme: Interdisciplinary learning – International Baccalaureate

Interdisciplinary Project-Based Learning – NAEYC

TILT: Toolkit for Interdisciplinary Learning and Teaching –The University of Edinburgh

Interdisciplinary Learning Guide – University of Liverpool

Education – Planetary Health Collaborative for Nurses & Midwives

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19. Research Literacy and Skills

Planetary Health is evidence-based and relies on robust data to advocate for change. Developing a broad understanding of several topic areas will allow educators to discuss them confidently and understand the complex systems that influence Planetary Health.

Robust, trustworthy data and evidence can be found on the websites of international agencies, such as the Organization for Economic Cooperation and Development (OECD), United Nations, and WHO. Educators are encouraged to read the statistics carefully, as they can easily be misinterpreted.

A useful mnemonic for evaluating evidence is CRAP—referring to currency, relevance, authority, and purpose.

Currency

Ensure your sources were published recently and represent the latest information available. Situations, context, and understanding change over time, and the evidence published last year may have since been superseded by more recent information. This can be particularly true for health and environmental data. If information changes, explain why; this can head off concerns that authorities were being untruthful or trying to cover up important information. Rely on academic papers and reports from reputable agencies, such as the United Nations agencies addressing climate and health, including WHO.

Relevance

Consider what evidence is the most relevant to your intended audience. Different audiences will be interested in different aspects of Planetary Health, and their interest may be shaped by many factors, such as which aspects are most likely to affect them, which they have the agency to influence, and their unique demographics, including geographic location or age.

Authority

Consider the authority of your source material. Peer-reviewed international academic journals are more likely to offer accurate, trustworthy data, but they may also be slow to publish new findings. Newspapers and other media may publish more quickly but may not check their findings so thoroughly.

Robust, trustworthy data and evidence can be found on the websites of international agencies, such as the Organization for Economic Cooperation and Development (OECD), United Nations, and WHO.

Climate change and health literature—such as IPCC Assessment Reports—often refer to "level of confidence" in the source, ranging from "very low" to "very high" (Kause et al., 2022). An authoritative source will give a high level of confidence.

Purpose

Consider the purpose of the information. Why was it created? Is it likely to be biased or is it trying to influence people in a particular way? Is it neutral and simply providing facts? Be mindful of potential political influences when using information published by local and national governments.

Resources for Educators

Introduction to Statistics – Curtin University

Integrity and Security in the Global Research Ecosystem – OECD

Communicating on Climate Change – United Nations

Introduction to Science in the UNFCCC – United Nations Framework Convention on Climate Change

Evidence, Policy, Impact: WHO Guide for Evidence-Informed Decision Making – World Health Organization

Strengthening Health Research and Evidence-Based Decision Making – World Health Organization

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20. Media, Social Media, and Information Literacy

Media and social media are ubiquitous in the modern world; we refer to several different sources, accessed through many platforms on multiple devices daily. This is referred to as our "communicative ecology" (Hearn & Foth, 2007) or "communications ecosystems" (Palau-Sampio & López-García, 2025).

Media and social media literacy training—whether relating to information on health, climate change, or the news stories of the day—needs to focus on teaching how to evaluate sources (Wathen & Burkell, 2002). People tend to turn first to trusted and validated sources they are familiar with; most also refer to several simultaneously, compare them, and are more likely to trust information when several sources agree (Cole & Watkins, 2015). Too strong a focus on misinformation can divert attention away from how to use responsible media, social media, and other sources well.

Social media especially can be a valuable tool for ground-up communication and influencing (Centre for Sustainable Healthcare, n.d.), sharing videos promoting Planetary Health, and highlighting dangers. Communication, advocacy, and social action will drive behavior change and influence policy: all are valuable skills for Planetary Health.

An extremely important aspect of media, social media, and information literacy is to avoid assuming that misinformation is rife and that anyone coming across it will be immediately taken in by it. The infodemic management program established by WHO during the COVID-19 pandemic defined an infodemic as "an overabundance of information—accurate or not" (Briand et al., 2023; WHO, 2023). Consistently, research shows that misinformation is the minority, online or in any other media (Ayikoru et al., 2023), and mostly ignored outside of echo chambers.

Any media or social media channel is just that: a channel. Reputable organizations and individuals can and do use them, as do less reputable ones. The source of the material is the key to evaluating it, not the channel or platform it is communicated through. Excellent sources of Planetary Health information include PHA's website (PHA, n.d.) and the many links and educator resources provided throughout this e-book.

Too strong a focus on misinformation can divert attention away from how to use responsible media, social media, and other sources well.

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21. Developing Uncertainty Tolerance Among Educators and Learners

Uncertainty tolerance, or the ability to remain comfortable and functional when faced with situations whose outcome is uncertain and unpredictable, is a crucial skill for students in all levels of education. This summary focuses on the tertiary education sector, particularly in the field of health professions education where ambiguity and unpredictability are inherent. The ability to navigate uncertainty effectively fosters resilience, adaptability, and critical thinking, preparing students for complex real-world challenges. There is a body of research examining uncertainty tolerance, which emphasizes the importance of integrating intentional and evidence-informed opportunities to develop uncertainty tolerance among learners.

Uncertainty tolerance refers to an individual's ability to manage and respond to ambiguous or unpredictable situations without experiencing excessive stress or disengagement. In educational settings, fostering this skill helps students develop confidence in decision-making, even when faced with incomplete or evolving information.

Uncertainty tolerance is particularly important in the field of Planetary Health because the challenges—such as climate change, biodiversity loss, and environmental degradation—are complex, unpredictable, and constantly evolving. The interconnectedness of human health and planetary systems means that solutions must be adaptive, interdisciplinary, and responsive to emerging data and shifting global conditions.

Planetary Health examines how human disruptions to Earth's natural systems impact global health. These disruptions—including pollution, deforestation, and climate change—create cascading effects that are difficult to predict. Professionals in this field must tolerate uncertainty to develop flexible, innovative solutions that address both immediate and long-term consequences.

Uncertainty tolerance is particularly important in the field of Planetary Health because the challenges—such as climate change, biodiversity loss, and environmental degradation—are complex, unpredictable, and constantly evolving.

Climate change and ecological shifts introduce uncertainty regarding future health risks, resource availability, and disease patterns. Healthcare systems must adapt to these uncertainties by integrating sustainable practices and preparing for unforeseen environmental health crises.

Additionally, Indigenous Knowledges must be prioritized in efforts to promote Planetary Health. However, integrating Indigenous perspectives requires deep reflection, humility, and an openness to different ways of knowing, which can challenge conventional scientific frameworks for some. Uncertainty tolerance enables professionals to engage meaningfully with diverse knowledge systems.

Decision-making in Planetary Health often involves ethical dilemmas, such as balancing economic development with environmental sustainability. Professionals must navigate conflicting interests and incomplete data, making uncertainty tolerance essential for ethical and effective policymaking.

By fostering uncertainty tolerance in Planetary Health education, learners can embrace complexity, remain adaptable, and contribute to solutions for global health challenges.

Tertiary education also plays a pivotal role in cultivating uncertainty tolerance by exposing students to complex, real-world problems that lack clear-cut solutions. In health education, for example, students must learn to make clinical decisions despite incomplete patient information or evolving medical guidelines. Without proper training in uncertainty tolerance, students may struggle with anxiety, indecision, or an over-reliance on rigid protocols.

Educators can support uncertainty tolerance development by encouraging open discussions about uncertainty in professional practice, designing assessments that require students to justify decisions made under uncertain conditions, and creating psychologically safe learning environments where students feel comfortable exploring ambiguity.

> **Shifting towards an uncertainty-inclusive curriculum requires a change in mindset, both for educators and students.**

Despite its importance, integrating uncertainty tolerance into tertiary education presents challenges. Many educators are accustomed to teaching for certainty, focusing on clear answers and structured knowledge acquisition. Shifting towards an uncertainty-inclusive curriculum requires a change in mindset, both for educators and students.

Institutional policies and assessment strategies play a role in shaping uncertainty tolerance. Inflexible grading systems that prioritize definitive answers may discourage students from embracing uncertainty as a learning opportunity. To counter this, educators must advocate for assessment models that reward critical thinking and adaptability rather than just correctness.

Uncertainty tolerance is an essential skill that must be nurtured during tertiary education. By incorporating uncertainty-focused teaching strategies, educators can equip students with the ability to navigate ambiguity confidently and effectively. As Lazarus's research suggests (2024), embracing uncertainty not only enhances learning outcomes but also prepares students for the unpredictable nature of professional life.

Resources for Educators

Preparing Learners for Uncertainty in Health Professions: A Handbook for Educators – Lazarus, M. & Stephens, G.

References

Lazarus, M. & Stephens, G. (Eds.) (2024). *Preparing learners for uncertainty in health professions: A handbook for educators*. Monash University. https://oercollective.caul.edu.au/uncertainty-in-health-professions

22. Nurturing the IDGs Among Learners

The Inner Development Goals (IDG) are the framework developed by a "non-profit initiative committed to fostering inner development towards more sustainable futures" (IDG, n.d.). A group of global thought leaders spearheaded this movement: "We research, collect, and communicate science-based skills and qualities that help us to live purposeful, sustainable, and productive lives" (IDG, n.d.).

This emerging framework underscores the importance of cultivating inner capacities as a foundation for advancing both individual and collective learning outcomes. By centering qualities such as self-awareness, empathy, perspective-taking, and systems thinking, the IDGs provide educators with a roadmap for fostering the personal growth that underpins effective engagement with complex global challenges. Research suggests that when students develop these inner capacities, they are better able to collaborate across differences, sustain motivation in the face of uncertainty, and translate knowledge into meaningful action (Norden, 2024). In this way, the IDGs complement traditional academic goals by embedding values, skills, and dispositions that enhance resilience, deepen critical thinking, and support the integration of sustainability and Planetary Health into educational practice.

Image source: Ankrah et al., 2023

Resources for Educators on IDGs

Sustainability and the Importance of Looking Within: ESG Currents – Bloomberg

Revolutionizing sustainability leadership and education: addressing the human dimension to support flourishing, culture, and system transformation – Wamsler, C., Osberg, G., Janss, J., & Stephan, L.

IMAGINE sustainability: integrated inner-outer transformation in research, education and practice – Ives, C.D., Schäpke, N., Woiwode, C., & Wamsler, C.

Inner Development Goals: from inner growth to outer change – Ankrah, D., Bristow, J., Hires, D., & Artem Henriksson, J.

Liminality: Change Starts Within – Rodriguez Carreon, V.

Plant and plan, care and grow. A hands-on exercise using the (inner) sustainable development goals to teach research methodology to final year sociology students – Costa, R. P.

A Novel Framework for Inner-Outer Sustainability Assessment – Cooper, K. J., & Gibson, R. B.

Broadening the Scope of Wellbeing Science: Multidisciplinary and Interdisciplinary Perspectives on Human Flourishing and Wellbeing – Kemp, A. H., & Edwards, D. J.

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Inner Development Goals. (n.d.). Inner development goals: Transformational skills for sustainable development. https://innerdevelopmentgoals.org/

Nordén, B. (2024). Advancing sustainability through higher education: Student teachers integrate inner development goals (IDG) and future-oriented methodologies. *Challenges, 15*(2), 28. https://doi.org/10.3390/challe15020028

23. Care of Students Learning Planetary Health Content: Active Hope

Students engaging with Planetary Health education often experience eco-anxiety, solastalgia, grief, anger, or helplessness (Hickman et al., 2021; Marks et al., 2021; Léger-Goodes et al., 2022; Tsevreni et al., 2025), concepts that are covered in greater depth in Chapter 37. These emotions are particularly intense among young people, who express deep concern for their futures in the context of climate change and biodiversity loss. Supporting students in learning spaces that are investigating existential threats requires intentional integration of emotional well-being into curricula, the creation of safe spaces for dialogue, and strategies that build resilience and agency.

A growing body of scholarship suggests that cultivating hope is central to addressing these concerns. Joanna Macy and Chris Johnstone (2022) describe Active Hope as a practice that involves acknowledging reality, clarifying values, and taking purposeful action. This practice frames hope as an orientation toward engagement rather than passive optimism.

Educators and scholars increasingly emphasize the pedagogical value of integrating hope and emotional awareness into climate and Planetary Health education. Vandaele (2022) argues that cultivating hope within curricula not only regulates worry but also fosters proactive engagement among students grappling with the climate crisis. Extending this work, Finnegan (2024) introduces the "Hope Wheel," a conceptual model that operationalizes hope as a guiding framework for embedding constructive, forward-looking pedagogy in climate education. Complementing these perspectives, Tsevreni et al. (2025) highlight the critical importance of creating intentional space for ecological emotions and of embedding holistic, relational approaches into teaching practice. Taken together, these contributions suggest that hope and emotional engagement are central to sustaining student motivation, resilience, and meaningful participation in climate action.

> **...hope and emotional engagement are central to sustaining student motivation, resilience, and meaningful participation in climate action.**

Educational programs can integrate Active Hope practices to help students process ecological emotions. These practices may include gratitude exercises; acknowledging grief; considering new perspectives, including those that account

for animals and the rights of nature; and envisioning futures and setting intentionality in co-creating these futures. These approaches promote resilience, empowerment, and agency. More information on these can be found in the book Coming Back to Life (Macy & Brown, 2014).

Broader approaches emphasize the importance of creating supportive learning environments where students' feelings are validated and processed. Strategies for this include facilitated dialogue, reflective group practices, arts and storytelling, rituals, and community support networks. Macy and Johnstone (2022) point to the power of collective practices to transform despair into constructive action. Encouraging agency, intergenerational solidarity, and constructive coping mechanisms offer critical pathways to sustain young people facing the realities of our triple planetary crisis.

Resources for Educators on Care of Students and Active Hope

Active Hope Training – Active Hope

The Work that Reconnects – Macy, J.

A Field Guide to Climate Anxiety: How to Keep Your Cool on a Warming Planet – Jaquette Ray, S.

Coming Back to Life: The Guide to the Work that Reconnects – Macy, J., & Brown, M. Y.

Active Hope (Revised): How to Face the Mess We're in with Unexpected Resilience and Creative Power – Macy, J., & Johnstone, C.

Working with Ecological Emotions: Mind Map and Spectrum Line – Panu Pihkala, Existential Toolkit for Climate Justice Educators

Publications on climate emotions and young people – Jones, C. A.

Children's Voices on Climate Change – One Earth

Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey – Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L.

Climate Psychology Alliance

Hope and Climate Change: The Importance of Hope for Environmental Engagement – Ojala, M.

Webinar: Cultivating Hope and Resilience in a Climate-Changed World – Ojala, M.

Holding together Hope and despair: Transformative learning through virtual place-based education in Aotearoa, New Zealand

Climate Change, Emotion, and Education: Hope and Possibility – Zambylas, M.

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24. Outcomes: Education Research Resources

Assessing outcomes is an integral component of educational design, and this is particularly true for Planetary Health. Assessment helps educators measure learning, consider goals and objectives, improve curricula, and demonstrate impact. In the context of Planetary Health education, assessment frameworks are increasingly focused on being holistic, equitable, and oriented toward resilience in the face of planetary crises.

Good resources help educators design assessments that are aligned with meaningful learning outcomes, ensuring that evaluation practices go beyond surface-level measurement. They support the effective use of both formative and program-level assessment strategies, offering ways to gather evidence of learning while guiding students' growth throughout their educational journey. Importantly, they emphasize equity and inclusivity, reminding educators to create evaluation practices that reflect diverse perspectives and reduce barriers to success. By tracking the impact of Planetary Health education through real-world examples, these tools also provide a pathway for educators to connect classroom learning with the pressing challenges and opportunities of our time.

Below are free resources to guide the development of assessments that are meaningful, equitable, and aligned with Planetary Health goals. The following resources are intended to support education research efforts aimed at examining the efficacy and impact of Planetary Health education.

Education research is a field dedicated to studying teaching methods, learning processes, and the effectiveness of educational systems. It aims to improve educational outcomes by developing evidence-based strategies that enhance student learning, engagement, and professional preparedness. In health professions education, research plays a critical role in shaping competency-based training, ensuring that graduates are equipped to address complex healthcare challenges, including those related to Planetary Health.

Good resources help educators design assessments that are aligned with meaningful learning outcomes, ensuring that evaluation practices go beyond surface-level measurement.

Resources for Educators on Learning Outcomes

Foundations of Health Professions Education Research: Principles, Perspectives and Practices – Rees, C. E., Monrouxe, L. V., O'Brien, B. C., Gordon, L. J., & Palermo, C.

Twelve tips to afford students agency in programmatic assessment – Jamieson, J., & Torre, D.

Monash Centre for Scholarship in Health Education

Professional Development – Monash Centre for Scholarship in Health Education

Introduction to Education Research in the Health Professions and Sciences – Monash Centre for Scholarship in Health Education

Resources for Educators: Sample Curricula, Curricular Guidelines, and Content by Age Groups

This collection supports scaffolded learning—from investigative science activities to global health systems thinking—and flexible adoption across educational contexts. Whether you're teaching 11-year-olds or 18-year-olds, these open-access materials help bring Planetary Health into real classrooms, nurturing informed young global citizens.

Middle School (Ages 11–14)

Growing Green Hearts eBook & Teaching Posters – Planetary Health Alliance

Earth Learning Idea

Eco-Schools Program – Foundation for Environmental Education

Early High School (Ages 15–16)

Planetary Health Teaching Guide – OER Commons

8 Free Planetary Health Education Tools for Back to School – Educated Choices Program

Resource Bank – Climate Resources for Health Education

Older Teens & Pre-University (Ages 17–18)

Planetary Health Brick Collection – ScholarRx

Planetary Health Education Toolkit – Institute for Planetary Health, Johns Hopkins University

Medical Education for Human & Planetary Health – Stanford Center for Innovation in Global Health

Assessment Planning & Program-Level Strategies

Learning Outcomes Assessment: A Practitioner's Handbook – Higher Education Quality Council of Ontario

Learning Outcomes Assessment Web Tools and Ecosystem – The University of Utah

Equity and Formative Assessment Practices

Equitable Assessments – University of Minnesota

Formative Assessment – Wikipedia

Broader Tools & Methodological Resources

Evaluation Resources – U.S. Department of Education

Assessment Resources – Association for the Assessment of Learning in Higher Education

Planetary Health–Embedded Assessment Example

An authentic learner-centered planetary health assignment: A five-year evaluation of student choices to address Sustainable Development Goal 13 – Frontiers in Public Health

Section 4: Content Areas for Planetary Health Education

25. Introduction

Education varies across disciplines and across the globe. Despite this variability, there are still common threads and essential content for Planetary Health education that are relevant for all fields. These core ideas provide the foundation for teaching and learning that addresses the scale and urgency of today's environmental and health challenges.

To meaningfully address the triple planetary crisis, it is critical for all people to understand that the Earth's natural systems are threatened by human behaviors. Human activities—especially those influencing consumption, population size, and shifts in demographics—are the primary drivers of changing weather patterns and temperatures, such as increasing emissions. These are not "acts of God" or "natural disasters." They are acts of humans and highly unnatural. Technology also has a negative impact on the Earth; for example, data centers—which are rapidly growing in number—produce electronic waste with hazardous materials and use significant amounts of energy and water (UNEP, 2025). These human-caused elements disrupt the planet's natural systems and feedback loops.

The Stockholm Resilience Center (Rockström, 2009) describes nine planetary boundaries that must not be exceeded if life is to continue to exist on this planet as humans know it. As of September 2025, seven of the nine boundaries had already been exceeded (Planetary Boundaries Science, 2025).

To solve these problems, we need transdisciplinary education in Planetary Health across the lifespan. We also need to ensure that all people of all genders have equal access to public education. The solutions to our urgent planetary crises will come when we work across social and political boundaries with a shared global language, a shared global vision, and a shared global strategy (PHA, n.d.b).

The three foundational Planetary Health education documents should guide the education and practice of all Planetary Health adherents. These are the Planetary Health Education Framework, which gives us a shared language; the São Paulo Declaration on Planetary Health, which provides a shared vision or blueprint for the future; and the Planetary Health Roadmap and Action Plan, which provides a shared strategy to make necessary changes in governance, business, and education.

To solve these problems, we need transdisciplinary education in Planetary Health across the lifespan.

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26. Anthropocene and Health: A Framework

The health of all planetary beings—humans, non-human animals, plants, and the environment—influences Planetary Health at all levels (Olea-Popelka et al., 2025). Nonetheless, it is important to discuss health in the 'Anthropocene' - a popular term used in science and scientific discourse to describe the period over which humans have damaged the Earth, as a separate topic.

The ways health is enabled and challenged in the Anthropocene differs from previous centuries of human civilization and evolution (Calaguas, 2025; Lencastre et al., 2025). When humans first evolved, threats to our health came predominantly from natural phenomena, such as bacteria, viruses, famine, or natural disasters (Schug & Buikstra, 2025). Health in the Anthropocene, however, is challenged by the environmental degradation inflicted on Earth and its life-supporting systems by agricultural and industrial revolutions, including global warming, pollution, and biodiversity loss. Patterns of urbanization create extreme poverty, overcrowding, sedentary lifestyles, and disassociation with nature (Shomuyiwa et al., 2025).

Combined with the challenges listed above, the life course of the average person has changed dramatically in this era. In pre-modern societies, death in childhood from infectious disease was common, while those who survived to adulthood suffered few noncommunicable diseases like cardiovascular disease, cancers, or diabetes. When people avoided famines, wars, and natural disasters, they lived reasonably healthy lives until they once again became vulnerable to infectious disease in older age (Cole, 2020). Today, people live longer lives, as life expectancy nearly doubled in high-income countries over the 20th century, but are not necessarily healthier. Health may need to be maintained by modern medicine—including vaccination, antibiotics, diagnostics, treatments, and surgery—that not everyone can afford. Access to such treatments across the world is highly uneven and unequal (Tosam et al., 2018).

Our capacity to live for many years with conditions that would previously have been fatal has changed our relationship with health and health systems. What incentive is there to remain healthy when modern medicine can address such a broad array of ailments? Considering health through a Planetary Health lens and recognizing the impact of the Anthropocene can help to promote a "health first" mindset in which we are encouraged and incentivized to stay healthy. This is often also referred to as preventative medicine or integrative health (Prescott et al., 2019; Potter & Schenk, 2025).

Health in the Anthropocene, however, is challenged by the environmental degradation inflicted on Earth.

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27. Anthropocene and Health: Solutions

Thinking of health in terms of health during the Anthropocene can change your perspective on how health is enabled whether you are a medical practitioner, policymaker, educator, or just someone wanting to remain healthy. This perspective allows people to look beyond pharmaceutical and surgical solutions to ill-health. Instead, other health-promoting concepts, like nature connectedness and evolutionary medicine, are centered.

Nature connectedness ensures we are surrounded by and spending time in unpolluted outdoor green space for its demonstrated benefits for our mental and physical health (Canadian Public Health Association, 2015; Parkes at al, 2020). Some physicians may prescribe patients time in nature for physical activity and exposure—a movement called "Green Prescribing" that is gaining popularity around the world (Stanhope & Weinstein, 2023).

Evolutionary medicine acknowledges that the present world is not the one we evolved to live in. This approach recognizes that the diets, exercise patterns, occupations, and social connections we maintain may not be ideal for our physical or mental health (Stearns, 2012; Benton et al., 2021).

Equity and social justice approaches to health recognize the huge global disparities in health caused by unequal distribution of, access to, and affordability of healthcare services and the unequal exposure to pollutants, clean water, and sanitation solutions (Foster et al., 2020; Anderson et al., 2025). Planetary Health strives for health at the global level—not just the community or individual level (Friel et al., 2022).

Finally, considering health during the Anthropocene necessitates deeper respect for traditional healing practices and traditional healers. Eurocentric biomedicine has made remarkable advances in vaccines, gene therapies, cancer treatments, heart and lung transplants, and knee and hip replacements over the past two centuries; however, people must engage respectfully with Traditional Medicine such as Ayurveda in India, Zhōng yī in China, or Muthi in Southern Africa, which are culturally appropriate, nature-based, and non-polluting. The value of traditional practices—particularly for preventative, restorative, and mental health—is recognized and supported in many global health systems. Planetary Health's deep respect for all cultures and for different ways of seeing the world recognizes the value of traditional healing practices and the people who practice them (Redvers, 2024; Seifert et al., 2025).

Nature connectedness ensures we are surrounded by and spending time in unpolluted outdoor green space for its demonstrated benefits for our mental and physical health.

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28. Consumption Patterns and Economics

Planetary Health conceptualizes human health and well-being as inseparable from the condition of Earth's life-support systems. Within this framework, it is crucial for teachers and learners to recognize that consumption patterns and prevailing economic models are increasingly considered fundamental drivers of ecological degradation, health inequities, and planetary boundary transgressions.

Consumption patterns are thus central to Planetary Health because aggregate household and industrial demand drives natural resource extraction, greenhouse gas emissions, biodiversity loss, and pollution (Haynes et al., 2025; Rockström et al., 2023).

The Planetary Boundaries framework (Richardson et al., 2023; Steffen et al., 2018) provides quantitative guidance that highlights how current consumption trajectories exceed safe operating spaces of Earth's nature systems. High-income countries' consumption accounts for a disproportionate share of transboundary environmental impacts (O'Neill et al., 2018; Wiedmann et al., 2020), reinforcing the need for just, equitable, and sustainable natural resources management and degrowth.

Recent empirical work demonstrates that the wealthiest 10–20% of consumers are responsible for the majority of planetary boundary transgressions, across both high-income and emerging economies. These patterns are reinforced by growth-oriented economic models that prioritize growth domestic product outputs over environmental and health costs. Comparative political economy studies highlight how consumption-led growth regimes actively encourage high-carbon lifestyles, considerable material flow, and social inequity, thereby undermining Planetary Health equity (Tian et al., 2024; Frank et al., 2024).

Alternative economic frameworks have gained prominence in the Planetary Health discourse. Doughnut Economics integrates social foundations with ecological ceilings, reframing economic success as meeting human needs within planetary boundaries rather than maximizing output (Raworth, 2017). Empirical applications at national and city levels suggest that this framework can guide policy alignment across health, environmental sustainability, and social justice domains. Similarly, degrowth and post-growth perspectives argue that absolute reductions in material and energy use in wealthy economies are necessary conditions for restoring ecological stability and improving shared and responsible commons governance (Perkins, 2019).

Sectoral studies demonstrate practical priorities: shifting diets toward plant-forward patterns, addressing unsustainable agricultural and animal agriculture practices, reducing food waste, extending product lifetimes, and electrifying services reduce combined emissions and resource use while often delivering health co-benefits.

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29. Interconnection Within Nature

Within the PHEF, the concept of interconnection within nature (IWN) is a central, foundational domain. IWN invites educators and learners to recognize that humans are inseparable from land, water, air, and the many forms of life that make up Earth's living systems. Dominant—primarily Euro-Western—institutions and knowledge systems have often marginalized this understanding; the PHEF therefore positions re-imagining our relationship within nature as a central and urgent task for educational institutions.

This way of understanding health in relationship with Earth's living systems is not new. Indigenous Knowledge traditions have articulated respect, reciprocity, kinship, and responsibility to the more-than-human world since time immemorial. Colonial worldviews, however, intensified separations between humans and nature, mind and body, and land and life, positioning animals, ecosystems, and nature writ large as property and resource. These separations continue to shape health systems, education, and environmental governance today. Through a decolonial lens, IWN becomes an invitation to question inherited assumptions about human exceptionalism, ownership, and control over nature—while also recognizing that relational ways of knowing have always existed and are gaining renewed attention in contemporary Planetary Health education.

The following nine concepts from the PHEF provide a structure for educators to explore and teach this theme.

1. **Traditional Knowledge Systems:** Refers to Indigenous, local, and community-based knowledge traditions are place-based and emphasize reciprocity, balance, and respect for the web of life.
2. **Nature Connectedness (Human–Nature Connectedness):** Refers to belonging with the natural world; linked with well-being and pro-environmental behaviors.
3. **Ecological Identity:** Refers to understanding one's identity as extending beyond the individual to include the natural world.
4. **Epistemological Diversity and Humility:** Refers to challenging Eurocentrism and valuing diverse epistemologies with humility.

Indigenous Knowledge traditions have articulated respect, reciprocity, kinship, and responsibility to the more-than-human world since time immemorial.

5. **Worldviews—From Animism to Cartesianism:** Refers to how different worldviews shape ecological relationships and practices.
6. **Two-Eyed Seeing (Etuaptmumk):** Articulated by Mi'kmaw Elder Albert Marshall, this calls for learning through both Indigenous and Western scientific perspectives for mutual benefit.
7. **Kincentric:** Refers to a worldview recognizing that humans are kin or family with other beings, including animals, plants, waters, and lands.
8. **Resilience:** Refers to the ability of ecosystems, communities, and cultures to adapt, persist, and thrive amidst disturbance.
9. **Pachamama, Gaia, and Similar Concepts:** Refer to Earth as a living system or mother figure (e.g., Pachamama in Andean traditions, Gaia theory in science), deepening respect and reverence for the planet.

Taking up these ideas can help to cultivate relational literacy, or the capacity to understand health as arising within relationships among people, place, and the more-than-human world and act with responsibility and care toward those relationships.

Resources for Educators on Interconnection Within Nature

Children & Nature Network

Center for Humans and Nature

Earth Charter Initiative

Kincentric Leadership

Pachamama Alliance

Planetary Health Education – Planetary Health Alliance

Terralingua

Nature Connectedness Research Group – University of Derby

Two-Eyed Seeing (Etuaptmumk) – Cape Breton University

Education for Sustainable Development – UNESCO

30. Nature-Based Conservation and Biodiversity

Conservation and stewardship of biodiversity is central to Planetary Health because the well-being of ecosystems—and the many beings who inhabit them—enables the conditions that make life and health on Earth possible. Around the world, much of this work is led by Indigenous communities and local peoples who maintain long-standing relationships of responsibility and care with the places they inhabit. These approaches may be described as Indigenous-led and community-led conservation, and they include initiatives such as Indigenous Protected and Conserved Areas, community conservancies, guardians programs, watershed restoration, and land-based education.

Many transformative practices occur outside formal education settings through community education initiatives, such as tree planting projects, land and nature camps, and community gardens. These initiatives provide ecological benefits alongside social benefits, including hands-on learning, intergenerational engagement, cultural engagement, and stronger community connections. Community-led conservation and citizen science projects further illustrate how local action connects to global Planetary Health goals. By combining biodiversity monitoring and restoration with participatory education, citizen science initiatives create pathways for collective responsibility and inspire sustainable practices rooted in place.

Teaching biodiversity through lived experiences—such as planting a seedling, restoring a watershed, or cultivating a community garden—builds ecological literacy while nurturing a culture of care. Several lessons emerge from successful examples. Local ownership and leadership are essential, particularly when Indigenous communities and equity-denied peoples guide priorities and decision-making. Hands-on, place-based learning deepens understanding and strengthens bonds with the land through nursery cultivation, habitat restoration, or tree planting. Integrating livelihood benefits such as agroforestry, ecotourism, and job creation ensures that conservation supports community well-being. Partnerships with nongovernmental organizations, governments, and academic institutions expand resources and legitimacy, while monitoring and adaptive management sustain biodiversity gains and community outcomes. Intergenerational involvement, with youth working alongside elders, helps embed stewardship across generations and creates a living legacy of ecological responsibility.

In this way, community and Indigenous-led conservation goes beyond environmental protection to become a vehicle for social resilience, cultural continuity, and Planetary Health.

Resources for Educators on Nature-Based Conservation and Biodiversity

Forest Trends

Fact Sheet: Community-led Conservation – Forest Trends

What's on the horizon for community-based conservation? – Esmail, N., et al.

Diverse Case Studies Show How Ecological Restoration Empowers Communities – Society for Ecological Restoration

Rewilding and Indigenous Community-Led Land Care – Derham, T. T., Mathews, F., & Johnson, C. N

Working together to scale ecosystem restoration: collective restoration in Aotearoa, New Zealand – McFarlane, K., et al.

Catalyzing success in community-based conservation – Fariss, B. et al.

Education – Convention on Biological Diversity

Earthwatch Institute

Forestry – Food and Agriculture Organization of the United Nations

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)

International Union for Conservation of Nature

Jane Goodall Institute

Education for Sustainable Development – UNESCO

Case Studies

Buffelsdraai Landfill Site Community Reforestation Project – Wikipedia

Community-based ecosystem restoration: Afghanistan – Nature-Based Solutions Initiative

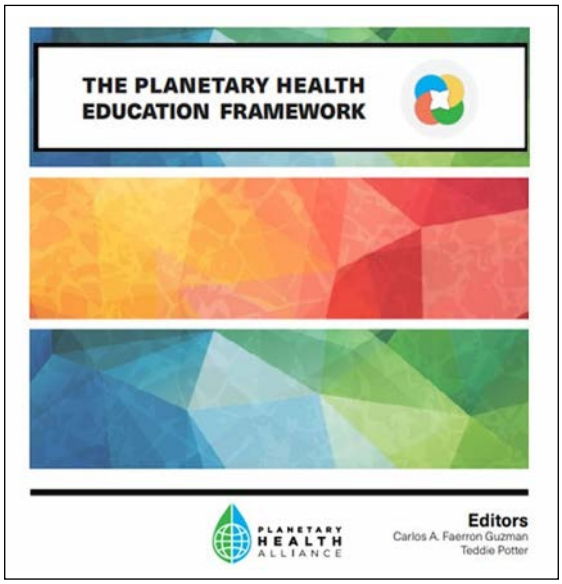
The Green Belt Movement – Wikipedia

A mecca for rewilders: the community-led project restoring Scotland's southern uplands – Martynoga, B.

Meet Kerala's 'rainforest gardeners' creating a Noah's ark for endangered plants – Vallangi, N.

Section 5: Frameworks for Planetary Health

31. Introduction



Planetary Health offers educators a unique way of looking at the world— a series of frameworks that can help students to understand complex socioecological adaptive systems (Iyer et al., 2021); interconnections; our place within nature, time, and space (Dunk & Anderson, 2020); and how different cultures see the world and these connections differently (Redvers et al., 2022). Many people who are new to the field of Planetary Health, and many who are working within healthcare systems across the world, may never have considered these frameworks before.

In the same way that this book builds on the PHEF, adding to the outline it drew of what Planetary Health education could be, so too do the frameworks here help to provide structure on which educators can build. Frameworks for movement building and systems change, equity and social justice, and ethics show what the world could be and how we can move towards those visions (de León et al., 2021); frameworks for incorporating traditional and non-traditional knowledges and cultural practices help educators to show their students that there is more than one way of seeing the world (Harvey & McEntee, 2023).

Frameworks are not prescriptions. Like this book, they are a guide, foundations on which to build upwards. They provide solid foundations from which to do so.

> **Frameworks for movement building and systems change, equity and social justice, and ethics show what the world could be and how we can move towards those visions.**

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32. Systems Thinking and Complexity

Systems thinking and complexity are at the heart of Planetary Health education. This lens allows us to see the interconnections and feedback loops that shape health outcomes across ecological, social, and cultural systems. A system cannot be understood by examining isolated parts. Emergence, a core systems thinking concept, necessitates the shift from linear logic to a holistic perspective. While all Planetary Health work relies on systems perspectives, the abstract nature of systemic complexity can be a barrier to students' understanding and application. Focusing on this domain gives educators the opportunity to teach students practical systems thinking tools and strategies. These tools function as a diagnostic map, surfacing the invisible interconnections that govern a system's behavior.

According to Jonassen et al. (2005), a fundamental aspect of scientific reasoning is predicting the impact of changes on system outputs and the creation and testing of systems models can support this reasoning process. However, most students have difficulty with crucial elements of systems thinking, including recognizing relationships between multiple variables, feedback loops, and interactions between humans and the physical environment (Cox, et al., 2017). A major challenge is translating sophisticated systems thinking strategies for novice learners.

Asking students to integrate systems thinking vocabulary and concepts in discussions and reflections is one effective approach, and resources such as the Waters Center for Systems Thinking's "Habit of a Systems Thinker"—linked below—can help. A more robust application to consider is engaging students in a systems project, choosing a Planetary Health issue of focus, ideally within a local context. Working with the iceberg model (Senge, 1990), students first identify symptoms or events at the observable level, and then move underneath the surface to research patterns and trends and identify stakeholders. The next step is to visualize the system structure using mapping tools, such as causal loop diagramming. Moving to the lowest level in the iceberg model, students interrogate mental models, the beliefs and values anchoring the system. Ultimately, the students identify key leverage points for change and propose interventions.

> **A system cannot be understood by examining isolated parts. Emergence, a core systems thinking concept, necessitates the shift from linear logic to a holistic perspective.**

System thinking tools can strengthen students' ability to frame and solve problems. Ideally, these tools are used in communities, with participants adding their diverse perspectives, creating systems models which are as accurate and equitable as possible. By cultivating systems thinking, learners develop humility in the face of complexity and an awareness of hidden biases. A systems thinking foundation prepares students to step into the field as effective change agents ready to meet global challenges.

Resources for Educators on Systems Thinking and Complexity

Iceberg Model – Ecochallenge.org

The Iceberg Model – New Philanthropy Capital

The Systems Thinking Iceberg – Leading Sapiens

Systems Thinking Resources – Donella Meadows Project

Waters Center for Systems Thinking

The Systems Thinker

Sand Talk: How Indigenous Thinking Can Save the World – Yunkaporta, T.

Thinking in Systems: A Primer – Meadows, D.

Systems Thinking for Social Change – Stroh, D. P.

Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants – Kimmerer, R. W.

Designing Regenerative Cultures – Wahl, D. C.

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33. Movement Building and Systems Change

At its core, Planetary Health is a field and a social movement, and two of the essential tenets of Planetary Health education are movement building and systems change. We therefore need to educate people about the principles and strategies of highly effective movements.

Two foundational documents provide guidance. The PHEF offers a detailed overview of the skills and principles needed to nurture systems change within education and practice. The Planetary Health Roadmap and Action Plan provides a practical guide to collective strategies, milestones, and pathways for advancing Planetary Health worldwide.

Planetary Health is a field and a social movement.

Together, these resources provide the scaffolding for movement building in Planetary Health, combining vision with practical tools to drive systemic transformation.

It is important for Planetary Health to build a movement that recognizes and affirms the unique needs of children. An excellent resource is Growing Green Hearts (PHA, 2024). The book includes narratives, ideas for classrooms, and effective strategies for engaging children.

Resources for Educators

The Commons Social Change Library

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34. Planetary Health Ethics

Planetary Health ethics (Foster et al., 2020) expands the scope of traditional bioethics and public health ethics by explicitly recognizing the interdependence of human well-being and the Earth's natural systems (Gruetzmacher et al., 2021). There is a subtle but important difference between ethics for the field of Planetary Health and medical bioethics approached through a Planetary Health lens (Anderson et al., 2025). The former encompasses and must work across many different disciplines and sectors. The latter focuses on the medical sector and how medical professionals can embed Planetary Health ethics into their work.

Planetary Health ethics emphasizes responsibilities that extend across generations, species, and ecosystems, and calls for frameworks of justice, reciprocity, and care that address the root causes of socioecological crises. For educators, Planetary Health ethics offers a foundation for guiding learners to think critically about the values embedded in health systems, governance, and daily practices.

Teachers and educators may want to consider the differences between principles (Prescott et al., 2018) and ethics. Principles are held individually—for example, a person choosing to be vegetarian as they feel strong principles towards the rights of animals—and may not align with societal norms. Ethics are held collectively and often signal what is considered acceptable or unacceptable according to the norms of wider society—for example, a society collectively permitting meat eating, even if individuals within it are vegetarian. Ethics can shift and change over time, whereas an individual's principles can be much harder to change. Educators need to be mindful that principles and ethics may be approached differently across different sectors and cultures (Ip, 2025; Sasongko et al., 2026).

What is considered Planetary Health ethics is not and should not be dominated by Global North cultural norms. Diverse views and viewpoints must have a voice if ethics are to be equitable.

Planetary Health ethics emphasizes responsibilities that extend across generations and calls for frameworks of justice, reciprocity, and care that address the root causes of socioecological crises.

Teaching this area provides opportunities to explore questions of equity of plants, nature, non-human animals, and humans; intergenerational responsibility; Indigenous sovereignty; and moral dimensions of sustainability. It cultivates the sensibilities of humility, justice, and solidarity that are essential to transforming culture and practice in the Anthropocene.

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35. Equity and Social Justice

The purpose of this section is to provide curated guidance about equity and social justice in the context of the triple planetary crisis, where compromised social and ecological determinants of health interact and compound inequity.

It is well established that the effects of climate change, increasing pollution, and biodiversity loss are not evenly felt. Communities that already experience structural disadvantage—for example, as a consequence of colonialism, racism, discrimination, and other forms of oppression—are likely to experience these impacts more intensely. At the same time, certain populations face heightened physiological vulnerability to environmental and climate harms. These populations may include infants and children, pregnant people, and older adults, whose bodies are more susceptible to air pollution, chemical exposures, malnutrition, infectious disease, extreme weather events, and heat-related illness. For these reasons, resources relevant to the health and well-being of structurally and physiologically vulnerable communities across the lifespan are included here.

In the context of Planetary Health, it is no longer sufficient to rely solely on human-centered definitions of equity. The definition needs to be revisited and expanded to include justice for non-human species, such as animals and plants, as well as ecosystems, lands, and waterways. This understanding is grounded in Indigenous knowledge traditions and clearly articulated in multispecies scholarship and Rights of Nature frameworks.

Alongside defining equity, this chapter provides resources on social justice, including power, voice, and recognition; distributive justice, referring to how benefits and burdens are distributed; and intergenerational justice, or our obligations to those not yet born. It includes multispecies justice, which examines how human systems—especially global political economies and colonial land relations—produce harm patterned across species. The Rights of Nature are also considered as an emerging legal and ethical framework that treats rivers, forests, and ecosystems as more than property, as living entities with inherent value, worthy of protection and representation.

> **“It is well established that the effects of climate change, increasing pollution, and biodiversity loss are not evenly felt.”**

Resources for Educators on Equity and Social Justice

Empathy
Empathy in Planetary Health means extending understanding and compassion not only to people, but to animals and the living Earth. Empathy helps drive climate action, solidarity, and resilience.

Empathy: Defined – Greater Good Science Center

Fostering empathy for sustainability education – UNESCO

Environmental and Climate Justice
Racism, colonialism, and other forms of oppression create and sustain environmental and climate injustices. Communities of color, Indigenous Peoples, and people living with low-income or poverty are disproportionately exposed to pollution, climate change, and ecosystem degradation.

Planetary Health calls for justice across societies, generations, and species. This means fair distribution of resources, protecting future generations, and recognizing the intrinsic value of non-human beings.

The adverse health impacts of environmental damage are disproportionately borne by infants and children, given their greater susceptibility to air pollution, malnutrition, infectious diseases, and climate anxiety; pregnant people, due to their increased vulnerability to risks associated with air pollution, chemical exposures, and heat; and elderly people, who are more vulnerable to extreme weather events, chronic disease burdens, and heat-related mortality. Frontline communities—including Indigenous Peoples, migrants, people living in poverty or without housing, and those living in climate-vulnerable regions—also face compounded structural disadvantages.

Climate Action Network

Environmental Justice Atlas

EarthRights International
Pachamama Alliance

Environmental Justice – United Nations Development Program

Epistemic Justice and Cultural Humility
Epistemic justice asks educators to consider whose knowledge is recognized as valid and how colonial histories shape what counts as evidence in Planetary Health education. Cultural humility complements this by encouraging ongoing self-reflection, attention to power, and respectful learning across knowledge systems and cultures.

Knowledge Justice in the Helping Professions – Campbell, H., et al.

Resources for Educators on Equity and Social Justice (cont)

Equity

Equity involves addressing systemic differences in health opportunities and outcomes, which are often rooted in structural racism, colonialism, gender inequality, and poverty. Inequities are exacerbated in the Anthropocene by uneven exposure to pollution, climate extremes, and biodiversity loss. *Privilege* refers to the structural advantages that some individuals or groups hold due to race, class, gender, geography, or citizenship. Recognizing privilege is essential in Planetary Health because it shapes exposure to risks, adaptive capacity, and participation in decision-making.

Health Equity – World Health Organization

Glossary of Essential Health Equity Terms – National Collaborating Centre for Determinants of Health

Racial Equity Tools

Indigenous Rights, Sovereignty, and Cultural Resurgence

These resources center Indigenous leadership, governance, and knowledges. They emphasize that land, water, culture, and health are inseparable, and that Indigenous sovereignty and cultural resurgence are foundational to ecological protection and community well-being. Together, they support educators in understanding Indigenous-led climate action, rights frameworks, and land-based learning as essential to decolonial and Planetary Health approaches.

Indigenous Climate Action

Indigenous Environmental Network

United Nations Declaration on the Rights of Indigenous Peoples

Indigenous Peoples – United Nations Department of Economic and Social Affairs

Dechinta Centre for Research and Learning

Rights of Nature and Multi-species Justice

Emerging legal and moral frameworks recognize ecosystems, rivers, forests, animals, and species as rights-bearing entities. This shifts from viewing nature as property to respecting it as a subject of justice.

Global Alliance for the Rights of Nature

Earth Law Center

Global Animal Law Association

More-Than-Human Rights Project

36. Traditional Ecological Knowledge and Indigenous Ecologies

Indigenous Peoples and local communities around the world have cultivated wisdom traditions, land-based sciences, and place-based practices that center relationship, reciprocity, and reverence for the Earth. These knowledge systems remind us that Planetary Health is not simply a technical or policy problem, but a moral and cultural responsibility. Traditional world and Indigenous medical practices and healers are the original knowledge holders of Eco-Health as their understanding of human health is not separate from the health of other species or the natural world. Their evidence base is deep, vast, and deserving of the respect of Eurocentric biomedicine.

The Waiora Indigenous Statement for Planetary Health and Sustainable Development affirms this truth:

"The health of people is intimately connected to the health of the planet. Our survival and well-being depend on the balance and interconnection between people, spirit, and environment. Indigenous worldviews and spirituality guide us to live well with the Earth and to restore the sacred relationships that sustain us" (Health Promotion Forum of New Zealand, 2019, p.1).

In the same spirit, the São Paulo Declaration on Planetary Health insists:

"We need a fundamental shift in how we live on Earth. Achieving what we call the Great Transition will require deep structural changes in how we produce and consume, how we build our cities, and how we measure growth and govern ourselves. It will also require rethinking our values and our relationships with Nature and with one another, from human exceptionalism and domination to interdependence, equity, and regeneration" (PHA, 2021, p. 2).

Traditional Ecological Knowledges are described as "relational, place-based, and embodied systems of understanding that integrate spirit, culture, and ecology" (Nelson, 2020). The Cultural Conservancy—established in 1985—partners with Indigenous communities to safeguard sacred sites, revitalize traditional foodways, and restore cultural practices. These efforts demonstrate that Traditional Ecological Knowledges extends beyond ecological observation; it embodies kinship, ceremony, and cultural continuity as foundations for sustaining the health of both people and ecosystems.

Planetary Health is not simply a technical or policy problem, but a moral and cultural responsibility.

Resources for Educators on Traditional Ecological Knowledges

Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants – Kimmerer, R. W.

Braiding Sweetgrass for Young Adults: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants – Kimmerer, R. W., & Smith, M. G.

Hospicing Modernity: Facing Modernity's Wrongs and the Implications for Social Activism – Machado de Oliveira, V.

The determinants of planetary health: an Indigenous consensus perspective – Redvers, N., et al.

Indigenous Peoples: Traditional knowledges, climate change, and health – Redvers, N., et al.

Epistemicide, health systems, and planetary health: Re-centering Indigenous knowledge systems – Redvers, N., et al.

Every day is Earth Day: Indigenous Peoples and their knowledges for planetary health – Redvers, N., et al.

Waiora: the importance of Indigenous worldviews and spirituality to inspire and inform Planetary Health Promotion in the Anthropocene – Tu'itahi, S., et al. (2021)

On disrupting colonial assumptions in health promotion: The Waiora, Rotorua, and Tiohtià:ke Statements – Sanchez-Pimienta, C.

Holding the Fire: Indigenous Voices on the Great Unravelling – Resilience

Indigenous Planetary Health Podcast

Waiora – Indigenous Peoples' Statement for Planetary Health and Sustainable Development

Making connections, finding balance – Hancock, T.

Two-Eyed Seeing (Etuaptmumk) – Cape Breton University

Indigenous Climate Action

The Cultural Conservancy

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37. Caring for Ourselves With Climate Anxiety, Eco-Grief, and Solastalgia

The impacts of climate and environmental change on mental health and well-being are profound and extend across ages, geographies, and contexts. These effects include experiences of climate anxiety, ecological grief, solastalgia, and other forms of distress that manifest differently across populations. Exacerbating factors such as vulnerability, marginalization, gender inequity, and stigma influence the degree to which individuals and communities experience and respond to these challenges (Hayes, 2020; Cunsolo et al., 2020).

Planetary Health education has a bi-directional role in this domain. On one hand, it raises awareness of climate-related mental health stressors, validating the emotions of anxiety and grief as part of a collective human response. On the other, it has the potential to exacerbate these feelings among learners if not facilitated with care, cultural sensitivity, and an emphasis on resilience, justice, and hope (Andreotti, 2021).

Educators play a pivotal role in acknowledging these layered experiences. They can support learners by integrating practices that create safe, reflective spaces for exploring ecological distress and by modeling adaptive strategies for moving with these feelings rather than suppressing them. Drawing on community-based and decolonial approaches, educators can shift the narrative from individual despair to collective resilience and solidarity (Andreotti, 2021; Macy & Johnstone, 2022).

> **The impacts of climate and environmental change on mental health and well-being are profound and extend across ages, geographies, and contexts.**

Resources for Educators on Caring for Ourselves

These resources emphasize that ecological grief is not pathological but a healthy, meaning-making response to unprecedented environmental disruptions. For educators, the key is to acknowledge these emotions, connect them to systemic drivers of planetary health crises, and guide learners toward constructive, justice-oriented pathways forward.

Active Hope

Climate Sanctuary

North American Climate Psychology Alliance

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Section 6: Finding Solutions

38. Introduction

Community connection and engagement are essential components of Planetary Health because resilience and adaptation depend not only on the actions of individuals but on the collective capacity of groups and societies. Resilience can be understood as the ability of ecological, social, and economic systems to withstand disruptions, adapt to change, and transform when needed, while still maintaining their essential functions. This perspective highlights the interdependence of human and natural systems, emphasizing that thriving communities and healthy ecosystems are inseparable.

Building resilience depends on strengthening relationships, fostering trust, and cultivating practices for collaboration. Communities that engage their members in meaningful ways are better equipped to identify local vulnerabilities, draw on diverse forms of knowledge, and co-create solutions that reflect the values and needs of the people most affected. Engagement also ensures that adaptation strategies are inclusive, equitable, and grounded in lived experiences rather than imposed from outside.

Cities and urban regions illustrate how engagement and resilience intersect in powerful ways. Urban areas face acute risks from climate change, such as flooding, heat waves, and infrastructure stress. They also provide opportunities for innovation and collective action. When residents are included in planning and decision-making, adaptation strategies become more responsive and sustainable, often blending technical interventions with social support systems.

Resilience is not only about responding to disasters. It is also about nurturing the capacity to imagine and build different futures. Community-led initiatives in rural villages, Indigenous territories, or city neighborhoods demonstrate how local knowledge, solidarity, and creativity can be mobilized to protect ecosystems, strengthen social networks, and inspire broader systemic change. Sharing stories of these efforts helps illustrate that resilience is as much about relationships and participation as it is about infrastructure or policy.

For students and educators, exploring resilience frameworks and examples of community engagement offers a deeper understanding of how collective action drives meaningful change. This approach shifts the focus from individual responsibility to shared capacity, demonstrating that planetary health is best supported when communities work together to care for each other and the environments they depend upon.

> **Resilience is not only about responding to disasters. It is also about nurturing the capacity to imagine and build different futures.**

Resources for Educators on Community Connection and Engagement

Resilience.org

Resilient Cities – World Bank

Sustainable Communities for a Healthy Planet – Zywert, K.

39. Cooperation and Collaboration

Consensus building requires listening, cooperation, ideas, and resources for working together. Educators can use consent, co-equal participation, and the ethics of thoughtful togetherness to model the skills and sensibilities that are needed to co-create the solutions needed to address the problems we are collectively facing.

Importantly, collaboration and partnerships with Indigenous wisdom keepers are essential to this work, as Indigenous Knowledge systems provide deeply rooted, place-based insights into sustainability, relational ethics, and community resilience. Recognizing and valuing these perspectives is right, and doing so fosters cultural respect and stronger ecological and health outcomes. Intersectoral and cross-disciplinary collaboration is at the heart of Planetary Health. Working across disciplines—including professionals in health, planning, education, economics, ecology, and the arts—creates opportunities for integrated solutions. Collaboration should emphasize co-design, where educators, students, practitioners, and community members contribute equally to building knowledge and designing interventions.

The principle of Two-Eyed Seeing (Etuaptmumk), as shared by Mi'kmaw Elder Albert Marshall, offers a guiding framework. It teaches us to see the strengths of Indigenous ways of knowing with one eye and Western knowledge systems with the other, and to use both together for the benefit of all.

Resources for Educators on Cooperation and Collaboration

Co-designing planetary health education: Empowering students and enhancing educator capacity – Monash University

Two-Eyed Seeing (Etuaptmumk) – Cape Breton University

Indigenous Climate Action

Education for Sustainable Development – UNESCO

International Association for Public Participation (IAP2)

40. Community Education and Development Initiatives

Community education and development initiatives empower local groups to take collective action toward sustainability, resilience, and learning outside formal school systems. These initiatives include public workshops, environmental restoration programs, participatory planning, and mentorship networks. They strengthen civic engagement and social cohesion while advancing Planetary Health.

Below are curated, freely accessible web resources to support educators, community leaders, and youth organizers in designing and implementing impactful programs.

Resources for Educators on Community Education and Development Initiatives

Community Tool Box – University of Kansas

Nature & Environment – OpenLearn

Educational Resources – Global Footprint Network

Environmental Education Activities – National Environmental Education Foundation

Community Resource Library – Association for Experiential Education

Free and Open Courses – United Nations Institute for Training and Research

Education for Sustainable Development – UNESCO

International Association for Public Participation (IAP2)

41. Summary and Conclusions

The Education Curriculum Committee's work reflects the growing recognition that Planetary Health education must be transformational, inclusive, and oriented toward solutions, with focus on the practices and skills we need to move into a fair, equitable, sustainable future. This needs to happen across all stages and places of learning. By grounding this guidance in the São Paulo Declaration on Planetary Health (PHA, 2021), the PHEF (Faerron Guzman et al., 2021), and the Planetary Health Roadmap and Action Plan (PHA, 2024), the Sub-Committee sought to advance a vision of education that is systemic, equitable, and oriented toward resilience in the face of planetary crises.

The work of this Sub-Committee is not a final product but a living, evolving resource. Its strength lies in its openness; contributions from educators, students, and community leaders worldwide are welcomed to ensure relevance, accessibility, and cultural resonance.

The work of this Sub-Committee is not a final product but a living, evolving resource. Its strength lies in its openness; contributions from educators, students, and community leaders worldwide are welcomed to ensure relevance, accessibility, and cultural resonance. By fostering networks of collaboration, supporting localized adaptations, and intentionally incorporating Indigenous and traditional knowledge systems, this collective effort aspires to create curricula that are globally informed and locally grounded.

In conclusion, the Planetary Health Curriculum Guidelines is both an invitation and a roadmap: an invitation for educators across the globe to join in the co-creation of transformative learning, and a roadmap toward embedding Planetary Health into the heart of education systems. It affirms that education is not only about preparing future leaders but also about empowering children, youth, adults, professionals, and communities to become Planetary Health citizens capable of advancing just, sustainable, and thriving futures.

These Curriculum Guidelines are provided by the Planetary Health Alliance's (PHA) Education Curriculum Committee. They aim to create a curriculum aligned with the PHA Roadmap's Guidance on Engaging the Education Sector in Revolutionizing Approaches to Education.

The Guidelines are intended to provide a universal, inclusive, and value-centered Planetary Health curriculum that reflects the urgent need for transformational education across the lifespan, drawing on key documents such as the São Paulo Declaration on Planetary Health, the Planetary Health Education Framework (PHEF), and Planetary Health Alliance Roadmap.

The guiding vision is to advance Planetary Health literacy while embedding principles of nature-connected learning, ethics, conservation, biodiversity protections, deep adaptation, post-growth economics, solutionary thinking, and collective health for all beings, now and in the future.

We hope that this curriculum guidance helps teachers across the world and at all levels of education to shape their own locally informed Planetary Health educational offerings.

PLANETARY HEALTH ALLIANCE