

Developing a Research-Based Green Jobs Inventory

The current generation of students will grow into the workforce at a time when our planetary health and existence hinge upon understanding and employing the wealth of human knowledge related to sustainability. This involves understanding complex science concepts, cultural ways of knowing that incorporate the fragility of the planet, and the ability to reason about the complex causal drivers of environmental and climate dynamics. They will also need the ability to engage in innovation, design, and “moonshot thinking,” to push beyond our current assumptions about how we function on the planet. Perhaps most importantly, they will need the social/emotional skills to lean into hope and engage in action at one of the most challenging times in the narrative of humans on Earth. They will need to adopt global, diverse, and collaborative perspectives. They will need the skills and adaptability to navigate a wide variety of careers, particularly family-sustaining green jobs that contribute to environmental preservation, conservation, and sustainability.

The inventory below lists skills that are discussed in the educational research as relevant towards engaging in the forms of thinking above. At this point, the list aims towards being exhaustive rather than conceptually tight. Following this broad sweep, it will be refined towards the aims of accessibility and useability. The inventory does not include disciplinary knowledge (Disciplinary Content or DCIs in the language of the Next Generation Science Skills (NGSS) as it aims to focus on skill categories, but it does include skills related to identifying misconceptions. In this session, we are asking for your input on the skills listed below. We are asking you to think about what is here and what is not here. The session will begin with a brief overview and explanation of the skill categories and then we will discuss the following questions:

1. Consider the broad dimension categories in the inventory. What makes sense to you? What do you wonder about?
2. Does anything seem to be missing from the broad dimension categories?
3. Choose one broad category that you feel most familiar with. Analyze the components within it. What thoughts do you have about it?
What are some components that might be missing?
4. What ideas do you have for gathering evidence for understanding of specific inventory items?
5. What are some populations with whom we might test out the inventory items?

Inventory of Green Jobs Skills

Inventory of Green Jobs Skills	
Dimensions	Notes:
A. Attentional Habits/Attitudes	Related to the Cross-Cutting Concepts of the NGSS
1. Analyzing Scale	
2. Detecting and Analyzing Patterns	
3. Analyzing Systems Dynamics	
4. Analyzing Structure and Function	
5. Considering Stability and Change	Earth as Dynamic
B. Reasoning about Systems and Complexity	(Relates to broader component A3)
1. Distributed Cause	
2. Action at an Attentional Distance	
3. Non-obvious Mechanisms	
4. Temporal Delays and Gaps	
5. Saturation, Tipping Points, and Triggering Events	
6. Non-linear Causality	
7. Processes and Steady States	
8. Emergence	
9. Domino Causality and Unintended Effects	(Relates to D9)
C. Social Emotional Mental Health Resources	
1. Reflection Strategies	
2. Conceptions of Hope	Ojala, 2017
3. Action-Orientation	
4. Mastery-Orientation	
D. Design Thinking and Innovation	
1. Problem-Awareness/Finding/Framing	
2. Understanding Constituents/ Audience/Users/Empathize	
3. Problem-Framing/Wording	
4. Brainstorming Strategies	(Turning Problems Inside Out; Evaluating Assumptions; Pushing Beyond the Obvious; Synectic Thinking, etc.)

5. Design Development	
6. Iterative Testing of MVPs	
7. Innovation Acceptance	
8. Scaling Considerations	
9. Impact evaluation	Tracing Intended and Unintended Outcomes (relates to B9)
E. Thinking like an Engineer	
1. Science and Engineering Practices (SEPs) in the NGSS	
2. Part-Whole Considerations	
3. Mechanistic Thinking	
4. Algorithmic Thinking	
F. Collective Awareness and Planetary Perspective	
1. Eco-centric Thinking	
2. Adopting Varied Perspectives	Moral Musical Chairs
3. Discerning Missing Voices	
4. Recognizing Environmental Injustices	
5. Agentive versus Collective Perspective	Abuntu and uMoya (South African conceptions of collectivity, spirit)
6. Non-Human Centric	
7. Overview Perspective	From Overview Effect, Seeing earth in space, Cuzzolino, 2019
G. Pluralistic Epistemologies “Seeing with Two Eyes”	
1. Nature of Western Science	
2. Indigenous Ways of Knowing/Being in Relation to Earth	
3. Varied Disciplinary Lens	How do we understand through the arts? ...the humanities, etc.?
H. Appreciation and Awe for Earth/Nature	
1. Zooming in and Out to Appreciate the Microcosmos and Macro-patterns	
2. Allowing for Awe and Wonder	Cuzzolino, 2019, Rachel Carson
3. A Sense of Humility About Human Understanding of the Planet	