

National Framework for Environmental Learning (NFEL): Learning Principles, Outcomes, and Pillar-aligned Indicators

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Purpose

The National Framework for Environmental Learning (NFEL) establishes a shared national vision for empowering learners, educators, and communities to participate in building a climate-resilient and environmentally flourishing Canada. The Environmental Learning Compass is a conceptual guide that illustrates the interconnected relationship between the major environmental challenges Canada faces (climate change, pollution, biodiversity loss), the key focus areas for environmental learning (such as expanding educator capacity and flourishing learning spaces) and the broader societal outcomes of a resilient population, strong economy, and planetary wellness.

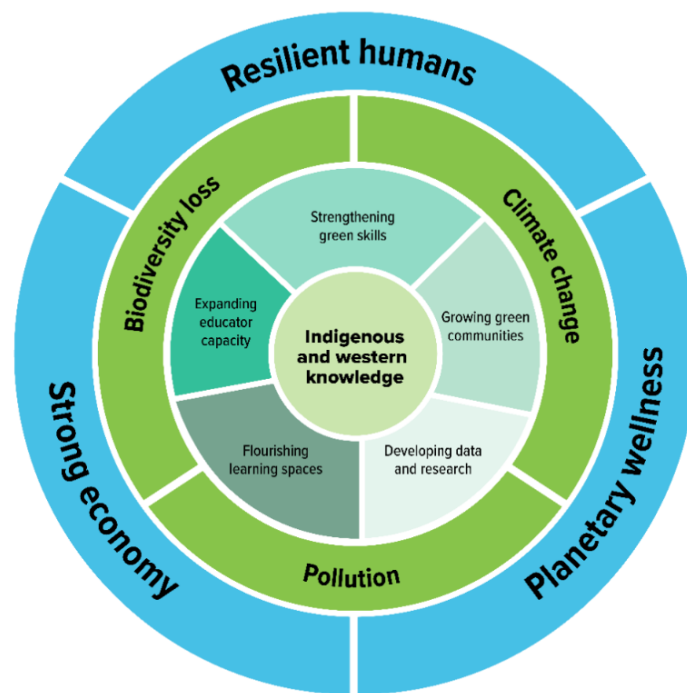


Fig. 1 Environmental Learning Compass

This document provides three layers that clarify the values, learning outcomes, and monitoring and evaluation of the implementation of the NFEL through pillar-aligned indicators.



- **Learning principles** articulate the overarching normative values, orientations, and ways of approaching environmental learning that guide how learning is designed and experienced across contexts.
- **Learning outcomes** describe what learners develop over time in terms of knowledge, skills, dispositions, and forms of agency related to climate change, biodiversity, and pollution. Learning outcomes are intended to be measurable or assessable.
- **Pillar-aligned indicators** provide measurable signals of progress in implementing the NFEL, organized by pillars (e.g., Expanding Educator Capacity, Flourishing Learning Spaces), and are used to monitor conditions, supports, and system-level change rather than individual learner achievement.

Fig. 2 Learning Principles, Outcomes & Indicators Organization

This structure has been designed to support coherence across jurisdictions, respects provincial jurisdictions in Canadian formal education systems, and considers environmental learning in alignment with Canada's international policy commitments and national policy priorities.

Learning Principles

These principles articulate the normative values and orientations underlying environmental learning outlined in the NFEL.

Holistic and Systems-Oriented

Environmental learning should emphasize regenerative solutions that address climate change, biodiversity restoration, and pollution, recognizing the interconnectedness of ecological, social, economic, cultural, and political systems across scales.

Lifelong, Place-Based, and Health-Supporting

Environmental learning should be lifelong and place-based, fostering meaningful engagement with local lands, waters, and communities. It should support physical, emotional, and cultural wellbeing through outdoor, experiential, and active forms of learning that promote healthy lifestyles, resilience, and care for human and more-than-human life across formal, non-formal, and informal settings.

Action-Oriented and Transformative

Environmental learning should support meaningful action, enabling learners and communities to contribute to mitigation, adaptation, restoration, and pollution prevention, and to participate in anticipatory and transformative change at individual, collective, and systemic levels.

Justice-Centred and Rights-Based

Environmental learning should be grounded in human rights, Indigenous rights, equity, and justice, addressing how environmental harms and benefits are distributed across peoples, places, and generations (as well as who is included in decision-making), and supporting ethical responsibility and accountability.

Pluralistic and Culturally-Responsive

Environmental learning should value and respectfully engage multiple knowledge systems, including

Indigenous knowledge, scientific knowledge, and local and cultural ways of knowing, recognizing diverse worldviews, histories, and ethical relationships with the more-than-human world.

Evidence-Informed and Critically Engaged

Environmental learning should be scientifically accurate, evidence-informed, and critically engaged, supporting learners to navigate uncertainty, assess information quality, and respond to misinformation and disinformation.

Learning Outcomes

The NFEL learning outcomes are anchored in a holistic focus on climate change, biodiversity, and pollution recognized as three of the most significant environmental challenges facing the planet and Canadians. Environmental learning is intentionally focused on these interconnected issues to support the development of knowledge, skills and capacities - including forms of agency - needed to navigate complex socio-ecological challenges shaping both human and more-than-human wellbeing.

The learning outcomes centre learning and learner development, while also being intentionally aligned with policy. They articulate cross-cutting competencies that extend beyond disciplinary knowledge and recognize green skills as broader than technical or occupational competencies., encompassing civic, ethical, relational, and systems-level capacities.

The learning outcomes were developed through a synthesis of contemporary environmental education research and practice and are informed by Canada's international environmental commitments and federal policy priorities, including the Paris Agreement (Article 12), the Kunming–Montreal Global Biodiversity Framework, the Baku Initiative on Human Development and Climate Resilience, the UN Convention on the Rights of the Child, and the UN Declaration on the Rights of Indigenous Peoples, as well as domestic strategies such as the Federal Sustainable Development Strategy, Canada's 2030 Nature Strategy, the National Adaptation Strategy, the Net-Zero Emissions Accountability Act, the Sustainable Jobs Act, and the Zero Plastic Waste Vision. Previous to developing learning outcomes, [a landscape review](#) was conducted that examined international, national, and subnational policies and plans to guide development of learning outcomes and indicators.

Key policies and their alignment with learning outcomes are provided in the following learning progression table.

NFEL Learning Progression Table

Outcome	K–5 (Early Years & Elementary)	6–9 (Middle Years)	10–12 (Secondary)
Systems Understanding	Recognize that plants, animals, water, climate, and people are connected. Describe simple cause-and-effect relationships (e.g., pollution harms animals; trees help clean air).	Explain how climate change, biodiversity loss, and pollution are interconnected and influenced by human activities such as energy use and consumption.	Analyze interconnected climate, ecological, biodiversity, and pollution systems across scales, including drivers such as fossil fuel use, land-use change, and overconsumption; evaluate feedback loops using scientific, Indigenous, and community knowledge.
	Key Policy & Framework Alignment: UNESCO GEP; Paris Agreement (Art. 12); UNFCCC ACE; Kunming–Montreal GBF; Climate Science 2050; FSDS		
Nature Connection, Wellbeing & Healthy Lifestyles	Develop care and respect for local land and water through outdoor exploration and play. Recognize that spending time in naturalized settings supports health and wellbeing.	Reflect on personal and cultural relationships to place. Understand how outdoor and place-based learning supports physical, emotional, and community wellbeing.	Develop ecological identity and resilience; engage in culturally safe, outdoor and experiential learning that supports wellbeing and belonging in a changing climate.
	Key Policy & Framework Alignment: UNESCO GEP; UNCRC (health & wellbeing); KMGBF Target 12		
Action Competence	Participate in simple actions (e.g., reducing waste, planting, conserving energy) and reflect on their impact.	Design and implement small-scale mitigation, conservation, or pollution-prevention initiatives and evaluate their effectiveness.	Identify, assess, and implement mitigation, adaptation, restorative, conservation, and pollution-prevention actions; evaluate ecological and social

			impacts at local and broader scales.
	Key Policy & Framework Alignment: UNESCO GEP; Paris Agreement Art. 12; National Adaptation Strategy; KMGBF Targets 2, 3 & 7; Zero Plastic Waste Vision		
Justice, Rights & Responsibility	Recognize that everyone deserves clean air, water, and safe environments. Demonstrate fairness and care in environmental situations.	Examine how environmental impacts affect communities differently; explore fairness, rights, and responsibilities in environmental contexts.	Analyze environmental injustice, colonial histories, Indigenous rights, gender and intergenerational equity; apply and assess ethical responsibility in environmental decision-making.
	Key Policy & Framework Alignment: UNESCO GEP; UNCRC; UNDRIP; TRC Calls 62–63; KMGBF Targets 22–23; SDG 4.7		
Technical Green Skills & Future Pathways	Explore how different people help care for the environment. Practice creative problem-solving in environmental projects.	Apply structured problem-solving and basic design-thinking approaches to local environmental challenges; explore green career pathways.	Develop competencies for net-zero transitions, biodiversity restoration, circular and regenerative resource use; apply design thinking and explore green careers and pathways.
	Key Policy & Framework Alignment: UNESCO GEP; Net-Zero Emissions Accountability Act; Sustainable Jobs Act; Baku Initiative; FSDS		
Collective & Civic Participation	Share ideas in class discussions and participate in group environmental projects.	Engage in structured dialogue and collaborative projects; participate in school-level environmental decision-making.	Participate meaningfully in democratic processes, youth–adult partnerships, community planning, and public policy processes related to environmental challenges.
	Key Policy & Framework Alignment: UNESCO GEP; UNFCCC ACE; Paris Agreement (Art. 12); Baku Initiative; OECD <i>Agency in the Anthropocene</i>		

Evidence-Informed Reasoning & Media Literacy	Ask questions about environmental information; distinguish simple facts from opinions; use basic observations and data.	Analyze environmental data; evaluate credibility of sources; recognize bias and misinformation in media and digital content.	Critically evaluate diverse information sources; identify misinformation and disinformation; weigh uncertainty and bias in making ethical environmental decisions.
	Key Policy & Framework Alignment: OECD Agency in the Anthropocene; UNESCO GEP; KMGBF Target 21		
Pluralism & Culturally Responsive Approaches	Learn that people have different ways of understanding and caring for land and water, including Indigenous teachings where appropriate.	Compare scientific, Indigenous, and local knowledge; reflect on how culture shapes environmental perspectives.	Respectfully integrate Indigenous, scientific, and local knowledge systems in environmental problem-solving; value diverse worldviews and support cultural and ecological revitalization where appropriate.
	Key Policy & Framework Alignment: UNDRIP; TRC Calls 62–63; KMGBF participation commitments; UNESCO GEP		
Design & Futures Thinking	Imagine how their school or community could be greener and suggest simple improvements.	Explore possible future environmental scenarios and consider trade-offs of different decisions.	Apply participatory design processes to prototype mitigation, adaptation, biodiversity restoration, and pollution-reduction initiatives; use futures thinking to assess long-term risks and opportunities.
	Key Policy & Framework Alignment: UNESCO GEP; OECD Agency in the Anthropocene; UNFCCC ACE; SDG 4.7; FSDS; National Adaptation Strategy; Sustainable Jobs Act; 2030 Nature Strategy; Net-Zero Emissions Accountability Act		

Communication & Knowledge Mobilization	Share learning about caring for the environment with peers and family.	Communicate environmental findings through presentations, digital media, and community engagement.	Communicate environmental challenges and solutions clearly; collaborate across sectors and generations; consider knowledge mobilization strategies to support action-taking.
	Key Policy & Framework Alignment: UNESCO GEP; UNFCCC ACE; Paris Agreement (Art. 12); KMGBF Targets 20–21; SDG 4.7		

Pillar-Aligned Indicators

A total of 170 indicators have been identified to facilitate discussion around *what* to measure and *how* to measure progress in the implementation of the NFEL. The indicators featured in the spreadsheet reflect a set of normative indicators (found in policies and plans from international jurisdictions, numbered 1 through “n” in Column A) and a set of possible indicators from the authors’ understanding of the field (number P1 through “Pn” in Column A). The indicators appear in no particular order; numbering has been assigned purely to facilitate review and discussion.

These indicators are indicative of a broad spectrum of possibility. The final set of indicators should be determined once the vision and outcomes of each NFEL pillar have been defined and finalized. In addition, each indicator would require further refinement and revision to align with the desired outcomes of the NFEL pillars and the NFEL’s targeted learning outcomes. For more information on the entire NFEL Indicator database, see Annex: The NFEL Indicators Spreadsheet.

For the purposes of facilitating discussion, the remainder of this section provides an overview of a selection of indicators for each pillar based on feasibility. Here, feasibility is defined in terms of whether there are existing data collection systems in place for that indicator, whether an entity may already be collecting similar data (e.g., EcoSchools Canada), and/or whether there are known data collection tools or methodologies (either in the literature or in practice) that could be easily adapted for the purposes of monitoring the indicator within the next calendar year. Consideration was also given to ensure there was balance across the three thematic areas of interest (climate, biodiversity, and pollution) where possible, and the scale of impact measured (nano, micro, meso, macro), as well as whether the inclusion of more “ambitious” indicators could help advance the field in terms of methodological development and/or evidence of impact.

Flourishing Learning Spaces				
#	Indicator Description	Feasibility	Scale	Theme
1	% of students with access to clean air	2	Nano	Pollution
8	Temperature kept below 26 degrees Celsius	3	Micro	Climate
10	Annual GHG emissions (direct and indirect) at the school level	2	Micro	Climate
12	GHG emissions reduced across public school buildings and education system	2	Macro	Climate
13	KWh energy saved at school	2	Micro	Climate
14	% of students with access to nature in and around education and care settings	2	Nano	Biodiversity
16	% of learners and school staff who walk/bike to school	2	Micro	Climate
65	Existence of mechanisms that promote the use of Indigenous knowledge, technologies, and skills in greening school grounds, promoting biodiversity on school grounds, building school community climate resilience and adaptation	1	Meso	All
P20	Number of schools and education facilities with clean energy	2	Meso	Climate
P22	Number of people, disaggregated by gender and other markers of vulnerability, with improved access to clean energy	2	Meso	Climate
P23	Number of fuel-saving/electric vehicles deployed	2	Meso	Climate
P29	Number of trees/native species planted and maintained on school grounds	3	Meso	Biodiversity
P32	% of schools with biodiversity-supporting green spaces	3	Meso	Biodiversity
P36	Tree canopy coverage on school grounds	3	Meso	Biodiversity

Expanding Educator Capacity				
#	Indicator Description	Feasibility	Scale	Theme
1	Number of teachers with increased confidence in their leadership and capacity around climate, biodiversity, and pollution actions	2	Micro	All
2	% of teacher CPD programs that integrate climate change, biodiversity, and pollution, disaggregated by teacher subject area	3	Meso	All
13	Number of universities and research institutes with enhanced capacity as centres of excellence in climate change, biodiversity, and pollution and in climate change, biodiversity, and pollution education teacher training	3	Meso	All
15	Number of teacher training institutions offering climate change, biodiversity, and pollution education courses	3	Meso	All

Strengthening Green Skills				
#	Indicator Description	Feasibility	Scale	Theme
1	Integration of climate change, biodiversity, and pollution topics in curriculum frameworks	3	Meso	All
64	Existence of mechanisms at the school level that promote the use of Indigenous knowledge, technologies, and skills in the teaching of climate change, biodiversity, and pollution	3	Micro	All
4	% of learning institutions with greened curriculum	3	Meso	All
5	Number of graduates with the skills for a net-zero economy	2	Macro	Climate
10	Number of hands-on projects and initiatives that build learners' and teachers' capacity and awareness of Canada's GHG emissions	2	Nano	Climate
15	Number of students participating in school-based opportunities to gain green career guidance, exposure, and experience	3	Nano	All
16	Number of opportunities provided to students to	2	Micro	All

	gain green career guidance, exposure, and experience			
17	% of schools delivering green careers information, advice and guidance	2	Meso	All
20	Time spent on climate change, biodiversity, and pollution education teaching and learning activities	2	Micro	All
24	Number of training programs focused on building capacities for climate adaptation and mitigation	2	Meso	Climate
31	Number of youth climate change, biodiversity, and pollution-related dialogue platforms, events, hackathons, etc. created	3	Meso	All
34	Number of schools with climate change/eco-clubs	3	Meso	All

Growing Green Communities				
#	Indicator Description	Feasibility	Scale	Theme
4	Perception of climate change, biodiversity loss, and pollution as a serious threat	3	Meso	All
5	Number of climate-, biodiversity-, and pollution-related activities organized for the school and the surrounding community	2	Micro	All
10	Number of Skills Bootcamps hosted for adults to upskill and retrain in key green sectors	3	Macro	All
P17	Number of partnerships between schools and community conservation organizations	3	Meso	Biodiversity
P18	Number of school-community biodiversity restoration projects	3	Micro	Biodiversity

Greening School Governance				
#	Indicator Description	Feasibility	Scale	Theme
2	Number of climate change, biodiversity, and pollution risks, hazards, and impacts being monitored	2	Meso	All
5	Existence of a Green School vision or policy (including school safety and education continuity management in the face of environmental/climate disruptions)	2	Micro	All
6	Number of schools with a Green School policy (including school safety and education continuity management in the face of environmental/climate disruptions)	2	Meso	All
7	Existence of a resourced Green School focal point or functioning monitoring team	2	Micro	All
8	Number of schools with a resourced Green School focal point or monitoring team	2	Meso	All
15	Number of functional eco-clubs formed (at school level)	2	Meso	All
16	Number of sectoral policies and strategies developed that include climate change, biodiversity, pollution learning	3	Meso	All
63	Amount of funding to Aboriginal schools to use Indigenous knowledge and teaching methods in classroom	2	Meso	All
21	Number of schools completing a climate change risk assessment and identifying actions to mitigate risks	2	Meso	Climate
22	Number of schools with a Disaster Management Plan taking into account climate-related risks	3	Meso	Climate
P27	Number and timeline of climate risks, environmental pollutants, and biodiversity indicators being tracked and monitored in education settings	3	Meso	All
P30	Number of days of learning lost due to climate disruptions and/or environmental hazards	3	Micro	Climate

Annex: The NFEL Indicators Spreadsheet

The Pillar-Aligned Indicators spreadsheet (see [tab “Full Range”](#)) has been developed to help facilitate thinking about *what* to measure and *how* in order to benchmark progress in implementation of the NFEL. The spreadsheet of indicators is not comprehensive nor exhaustive. Many would require further definition, refinement, and revision, especially to align with the anticipated outcomes of each NFEL pillar. The Indicator Spreadsheet should be viewed as indicative of a spectrum of possibility, and should be considered, refined, and revised in tandem with the desired outcomes of each pillar of the NFEL framework as well as to its targeted learning outcomes. The final set of indicators should be determined once the vision and outcomes of each NFEL pillar have been finalized.

The spreadsheet is organized according to the NFEL pillars, with some adjustments made based on gaps identified from the landscape review. Specifically, Strengthening Green Skills has been expanded to create room for considering shifts in teaching and learning necessary to support the development of a “breadth” of green skills for green jobs as well as the broader social and economic systems transformations needed ([Kwauk & Casey, 2022](#)). The Data and Research pillar has been proposed to focus on Greening School Governance (potential new name for the Data and Research pillar) more broadly, including considerations of policy and planning, governance and coordination, as well as data and evidence. Finally, a new pillar has been proposed that focuses on the promotion of climate and environmental justice, especially for ensuring efforts to promote environmental learning also promotes equality, equity, and justice for Indigenous people and others experiencing intersecting disadvantage or structural harm. There are merits for integrating this last proposed pillar throughout each pillar rather than highlighting them as its own pillar. For the purposes of calling attention to this dimension they have been separated out visually in the “Full Range” tab, but integrated into relevant pillars in the “Analysis of Indicators” tab informing the charts below.

The indicators featured in the spreadsheet reflect a set of normative indicators (found in policies and plans from international jurisdictions, numbered 1 through “n” in Column A) and a set of possible indicators from the authors’ understanding of the field (number P1 through “Pn” in Column A). The indicators appear in no particular order; numbering has been assigned purely to facilitate review and discussion.

The normative indicators were identified from the landscape review of existing policies, strategies, and plans at the national, sub-national, and international levels. These have been either copied verbatim or revised slightly into indicator “language” and/or for a more general geographic context than their original description. The normative indicators reflect the current state of how existing policies, plans, and strategies are conceptualizing the monitoring and evaluation of environmental learning and/or greening education. Many are focused on measuring outputs (numbers of..., percentages of..., etc.), rather than on measuring outcomes (e.g., learning outcomes, behavioral change, climate impact, etc.).

The possible indicators were developed from an independent exercise mapping conceptual pathways from education investments to climate impact and a rapid review of the state of data and evidence of these impacts (Kwauk, 2025). They have been included to provide a sense of the bigger picture of possible indicators, beyond what existing policies and strategies currently call out, that could be developed as the NFEL, its vision and outcomes, are further refined and/or defined. The possible indicators reflect a range of “greening education” activities that align with the NFEL pillars, but also help to illuminate gaps in attention by the NFEL (e.g., planet-friendly foods as part of flourishing learning spaces, climate- and environmental-risk data monitoring systems, climate-proof retrofits to school buildings). They also include more outcomes- and impact-oriented indicators.

Figure 3 provides an overview of the indicator database organized by pillar and by theme—i.e., whether the indicator tracks outcomes relevant to climate change, biodiversity, or pollution outcomes, or outcomes relevant to all three themes. Out of all 170 indicators, 59% are relevant for tracking all three themes; 27% pertain specifically to monitoring climate outcomes, 9% specifically to biodiversity outcomes, and 5% specifically to pollution outcomes.

Some pillars are more conducive to capturing outcomes relevant to all three thematic outcomes—for instance, 89% of indicators for Expanding Educator Capacity, 77% of Greening School Governance, 71% of Strengthening Green Skills, and 65% of Growing Green Communities. Nearly half of indicators for Flourishing Learning Spaces are specific to climate-relevant outcomes. Still yet, some pillars like Expanding Educator Capacity and Greening School Governance may need some additional work identifying theme-specific outcomes relevant to biodiversity and pollution.

Theme

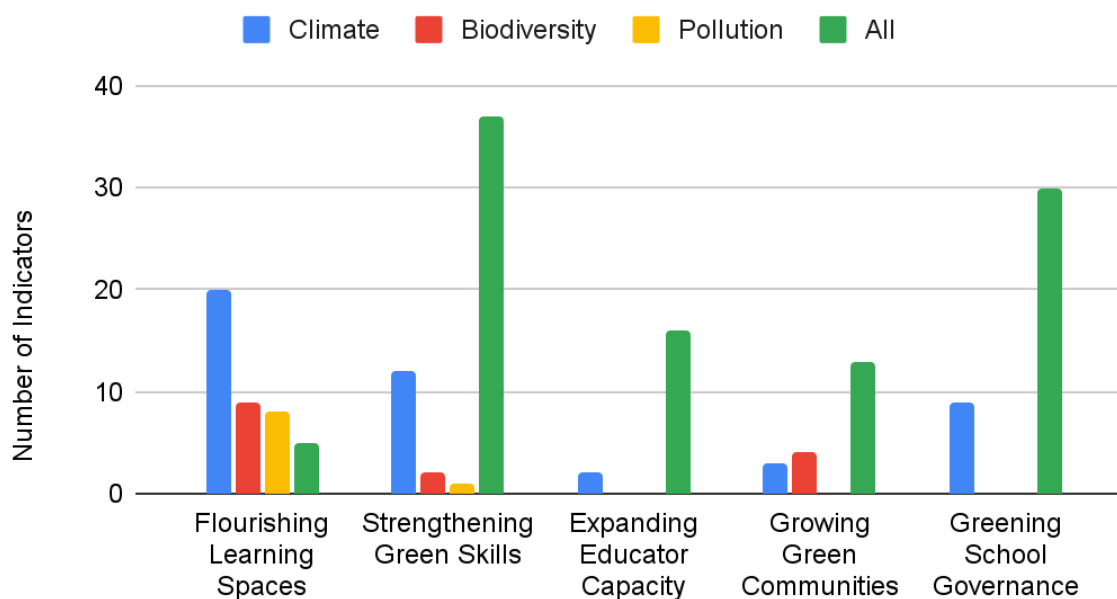


Fig. 3. NFEL Indicators, by thematic area of outcome

Each indicator has also been ranked for feasibility (see Figure 4):

- “1” indicates low-feasibility: data collection methods do not currently exist and/or do exist but would require significant development, adaptation, changes to existing practices or processes, piloting and review, and/or resources before implementation is feasible.
- “2” indicates mid-feasibility: data collection methods exist, but would require some training, adaptation, changes to existing practices and processes, and/or resources to collect and/or monitor regularly; or methods do not exist but could be developed within a reasonable timeframe and with limited resources.
- “3” indicates high-feasibility: data collection methods are already in place and being implemented, or would require slight adaptations to implement in the context of NFEL monitoring.

Most indicators in the database (86%) have a mid- to high-feasibility for data collection within the short term. The remaining 14% of indicators may require further investment and R&D to be fully implementable. Notably, nearly a quarter of Strengthening Green Skills indicators will require such development.

Feasibility

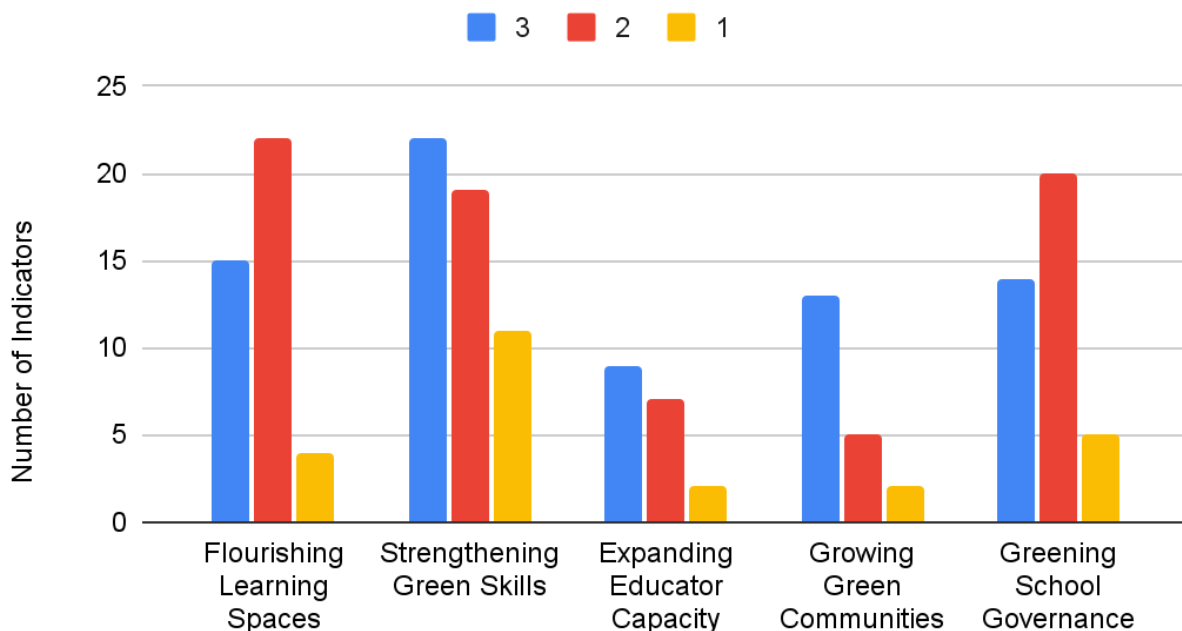


Fig. 4. NFEL Indicators, by feasibility of data collection

Finally, each indicator has been tagged by scale (see Figure 5):

- Nano: individual, classroom
- Micro: school

- Meso: provincial, territory, sub-national
- Macro: national, global

Recognizing that some indicators could be measured at multiple scales, each indicator has been tagged based on the “lowest” scale possible.

There is quite the distribution of indicators across each pillar, with every pillar capable of being monitored at any scale of impact. The majority of all indicators (54%) could be used to measure meso-level outcomes, although 5% may be limited to measuring macro-level outcomes. The remaining indicators can be applied to tracking outcomes at the individual and classroom levels (nano, 20%) and at the school level (micro, 22%). It is perhaps no surprise that nearly half of the indicators for Strengthening Green Skills are nano-level indicators, while three-quarters of the indicators for Greening School Governance are more appropriately measured at the meso-level.

Scale

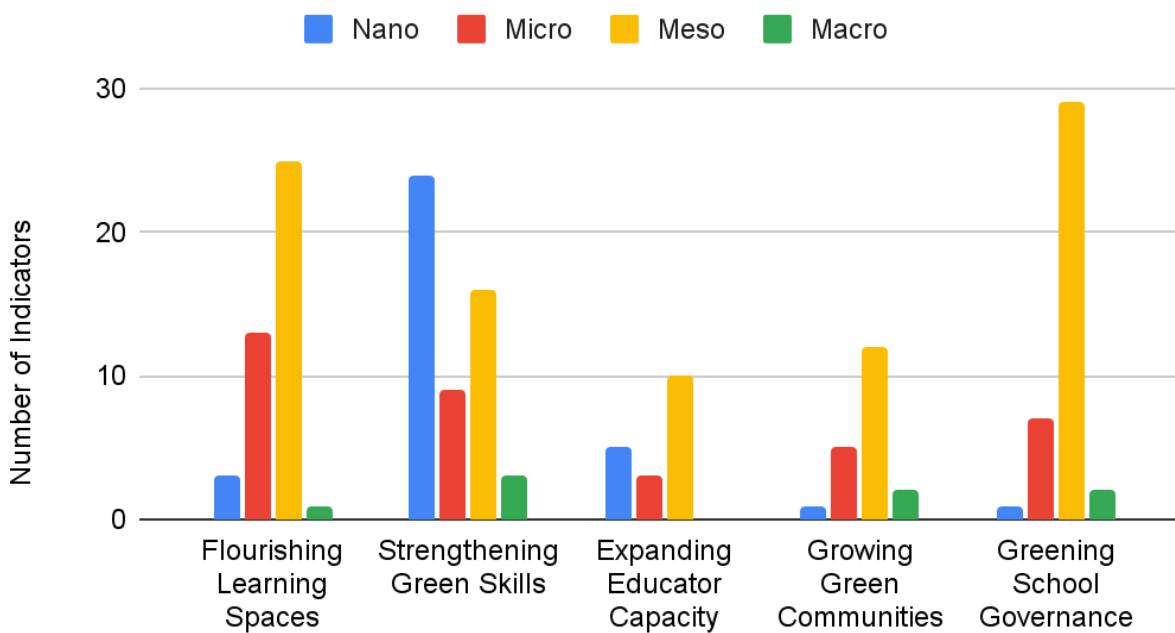


Fig. 5. NFEL Indicators, by scale of outcome measured