

## **Appendix A. Milestone Assessment Rubrics**

The following rubrics are the result of an eight-month collaborative effort of Nightingale faculty. The milestones represent curriculum embedded performance assessments that the faculty use to gauge progress for growth in the knowledge/skills associated with the given competency.

### **Figure A1.**

#### *Systems thinking*

Milestone 1	Identifies and explains cause and effect relationships in a system.
Milestone 2	Models the cause-and-effect relationships in a system.
Milestone 3	Models the cause-and-effect relationships in a cultural, political, economic, or ecological system. Identifies the model's limitations.
Milestone 4	Models the interrelationships in a socio-ecological system. Identifies the model's limitations.
Milestone 5	Models the interrelationships in a socio-ecological system. Analyzes the leverage points with the system and uses them to make the system's outputs more sustainable.

### **Figure A2.**

#### *Values Thinking*

Milestone 1	Supports conclusions with evidence from robust sources.
Milestone 2	Explains how institutions maintain the dominant structures that influence the dominant assumptions that influence the development of individual identities.
Milestone 3	Analyzes the interdependencies of systems of oppression and how they operate on oneself and one's community in mutually reinforcing ways.
Milestone 4	Models a systematic approach to be more inclusive which include goals, targets, and progress checks.
Milestone 5	Envisions and advocates for an inclusive environment that elevates a community's cultural competence.

**Figure A3.**

*Futures Thinking*

Milestone 1	Collects and graphs ecological, social or economic data. Analyzes it for patterns.
Milestone 2	Collects and graphs ecological, social or economic data. Analyzes it for patterns. Determines factors that are responsible for these patterns and the possible socio-ecological implications.
Milestone 3	Identifies events in the recent past (aka signals) that have a greater probability of affecting personal, institutional or community wellness. Adapts a personal community wellness plan to account for these signals.
Milestone 4	Identifies the drivers of the signals that have a great probability of affecting personal, institutional or community wellness. Based on the drivers and signals, create a strategy for personal or community wellness.
Milestone 5	Envisions and advocates for an environment that will buffer an institution or community against future risk. Implements a plan that includes accountability metrics.

**Figure A4.**

*Collaboration*

Milestone 1	Uses divergent thinking to generate creative ideas by exploring many possible solutions.
Milestone 2	Incorporates feedback from two or more people on a project.
Milestone 3	Identifies and explains multiple perspectives (such as cultural, disciplinary, and ethical) when exploring subjects within natural and human systems.
Milestone 4	Evaluates and applies diverse perspectives to complex subjects within natural and human systems in the face of multiple and even conflicting positions ( <u>i.e.</u> cultural, disciplinary, and ethical)
Milestone 5	Leverages diverse perspectives to complex subjects within natural and human systems, in the face of multiple and even conflicting positions ( <u>i.e.</u> cultural, disciplinary, and ethical), to solve a problem related to the sustainable development goals (SDGs).

**Figure A5.**

*Strategic Thinking*

Milestone 1	Identified patterns, verbal and/or behavioral, and the place of the individual in society.
Milestone 2	Explains the interrelationships between the social, economic, ecological, and/or architectural history of a place and how the interrelationships contribute to its continuous health.
Milestone 3	Explains the interrelationships between the social, economic, ecological, and/or architectural history of Nightingale School's place ( <a href="#">i.e.</a> Carnegie Hill) and how the interrelationships contribute to its continual health.
Milestone 4	Writes a reflective piece from a service project that aligns with and enhances curricular content.
Milestone 5	Applies a design thinking approach to produce something that addresses the needs of community members.

## **Appendix B. Professional Action Competence (PAC) Survey**

The following are screenshots of the survey questions used for quantitative data collection. The first section of the survey was a list of three demographic questions. The second section was ten questions measuring the self-efficacy to engage in ESD. The third section was eleven questions measuring the pedagogical knowledge to engage in ESD. The fourth section was ten questions measuring the willingness to engage in ESD. The last section was three questions measuring the perceived importance of ESD.

### **Figure B1.**

#### *Demographic Questions*

How many years have you taught at Nightingale?

3 or less

4 to 10

11 to 20

over 20

As part of Nightingale's DEI programming, in which of the following are you a participant?

White Antiracist Learning Spaces

BIPOC Affinity Groups

In which division are you most associated?

Upper School

Middle School

Lower School

**Figure B2.**

*Questions Measuring the Self-Efficacy to Engage in ESD*

I am confident that as a teacher I can...

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
develop students' ability to view a problem from different points of view.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
develop students' ability to weigh different solutions to sustainability issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
develop students' ability to reflect on their own actions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
develop students' ability to express their own views on sustainability issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
develop students' ability to understand the interconnectivity between social, environmental and economic aspects of sustainable development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make students realize that there are conflicting issues on the road to sustainable development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make students realize that the road to sustainable development contains a high degree of uncertainty.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
develop students' ability to act for sustainable development at a local level (e.g. in the school).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ability to act for sustainable development at a regional level (e.g. in the municipality).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
develop students' ability to act globally for sustainable development (e.g. boycott certain goods).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure B3.**

*Questions Measuring the Pedagogical Knowledge to Engage in ESD*

I am confident as a teacher I can...

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
make Education for Sustainable Development (ESD) happen in my class(es).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make ESD happen in my school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
evaluate an ESD project I (we) have implemented.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
address the environmental aspects of sustainability issues in my teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
address the social aspects of sustainability issues in my teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
address the socio-economic aspects of sustainability issues in my teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
address the global aspects of sustainability issues in my teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
work on sustainable development in the spirit of the attainment targets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
work across disciplines on sustainable development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
formulate learning objectives for my students regarding sustainable development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
have the flexibility to design learning environments to work on sustainability issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure B4.**

*Questions Measuring the Willingness to Engage in ESD*

Please indicate your level of agreement with the statements below.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Each day, I make sure that I have enough opportunities to dedicate myself to Education for Sustainable Development (ESD)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ESD is typically me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ESD is close to my heart. Without ESD I wouldn't be myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implementing ESD gives me energy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to plan my daily work so that I have as much time as possible to spend on ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I'm working on ESD, I experience that as an intense experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ESD will play an important role in my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often feel a strong urge to work with ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am often really looking forward to working with ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many of my personal goals are related to ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure B5.**

*Questions Measuring the Perceived Importance of ESD*

With these questions we want to gauge your understanding of what may or may not be the task of teachers in the context of ESD.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Providing students with education regarding sustainable development is a core task of teachers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a teacher I am prepared to take up my task regarding Education for Sustainable Development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am convinced that as a teacher I have to play a role in Education for Sustainable Development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## **Appendix C. Interview Questions**

The following are the interview questions for qualitative data collection. The first five were asked of Nightingale faculty participants. The second five were asked of Nightingale student participants.

### Interview questions for faculty

1. How has your understanding of sustainability changed over the last two years?
2. Describe a unit you have taught that best facilitates student growth in one or more of the sustainability competences.
3. How might you individually, and your department collectively, adjust the curriculum to better educate for sustainability?
4. At Nightingale, how do you think your department's role in sustainability education compares to the other departments?
5. In regards to your teaching role at Nightingale, when you consider the challenges that our students will be facing in the future, how do you feel?

### Interview questions for students

1. Talk about the conversation(s) you have had with your advisor about sustainability education at Nightingale, and highlight what you took away from the conversation(s).
2. When looking back at the sustainability related assessments you took in your courses, which one stood out as the most meaningful? Why?
3. Consider the service you have already done or are already planning to do for your community (Nightingale or beyond), and explain why you chose that form of service.
4. When you read the list of the 17 U.N. Sustainable Development Goals with your advisor, what thoughts and feelings did you have?
5. Are any of the SDGs particularly concerning to you? If so, how might you be part of the solution?

### Appendix D. Quantitative Analysis for Demographic Subgroups

The following tables provide descriptive statistics and t-test results between the pre- and post-survey variables for the demographic subgroups. The variables include PAC, and its component variables of self-efficacy, pedagogical knowledge, and willingness to engage in ESD.

**Table D1.**

*Upper School*

Variable	Pre-Survey (N=31)		Post-Survey (N = 32)		df	t	p
	M	SD	M	SD			
Self-Efficacy	3.83	0.60	3.82	0.72	62	0.05	0.97
Pedagogical Knowledge	3.68	0.61	3.61	0.73	62	0.41	0.69
Willingness	2.97	0.81	3.43	0.87	62	-2.2	0.03
Professional Action Competence	3.75	0.56	3.66	0.69	62	0.57	0.57

**Table D2.**

*Middle School*

Variable	Pre-Survey (N=18)		Post-Survey (N = 17)		df	t	p
	M	SD	M	SD			
Self-Efficacy	3.85	0.48	3.79	0.50	33	0.37	0.71
Pedagogical Knowledge	3.58	0.82	3.70	0.63	33	-0.5	0.62
Willingness	2.95	0.71	3.30	0.76	33	-1.4	0.17
Professional Action Competence	3.62	0.74	3.65	0.63	33	-0.13	0.90

**Table D3.**

*Lower School*

Variable	Pre-Survey (N=16)		Post-Survey (N = 15)		<i>df</i>	<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Self-Efficacy	3.76	0.60	3.54	0.47	30	1.12	0.27
Pedagogical Knowledge	3.43	0.53	3.56	0.42	30	-0.7	0.47
Willingness	2.53	0.58	3.33	0.94	30	-2.9	0.01
Professional Action Competence	3.54	0.55	3.66	0.39	30	-0.70	0.49

**Table D4.**

*Teachers with 1-3 Years of Experience at Nightingale*

Variable	Pre-Survey (N=20)		Post-Survey (N = 12)		<i>df</i>	<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Self-Efficacy	3.89	0.56	3.84	0.53	30	0.22	0.83
Pedagogical Knowledge	3.60	0.74	3.86	0.63	30	-1.0	0.33
Willingness	2.89	0.62	3.44	0.80	30	-2.1	0.04
Professional Action Competence	3.68	0.69	3.79	0.63	30	-0.44	0.66

**Table D5.**

*Teachers with 4-10 Years of Experience at Nightingale*

Variable	Pre-Survey (N=19)		Post-Survey (N = 29)		df	t	p
	M	SD	M	SD			
Self-Efficacy	3.89	0.63	3.74	0.63	27	-0.1	0.61
Pedagogical Knowledge	3.67	0.63	3.57	0.63	27	-1.1	0.61
Willingness	2.77	0.90	3.48	0.88	27	-2.4	0.009
Professional Action Competence	3.73	0.62	3.62	0.63	27	-1.3	0.56

**Table D6.**

*Teachers with 11-20 Years of Experience at Nightingale*

Variable	Pre-Survey (N=16)		Post-Survey (N = 13)		df	t	p
	M	SD	M	SD			
Self-Efficacy	3.71	0.46	3.74	0.74	18	0.65	0.89
Pedagogical Knowledge	3.44	0.68	3.73	0.75	18	1.53	0.28
Willingness	2.76	0.67	3.44	0.83	18	0.59	0.02
Professional Action Competence	3.53	0.61	3.82	0.66	18	1.88	0.22

**Table D7.**

*Teachers with over 20 Years of Experience at Nightingale*

Variable	Pre-Survey (N=20)		Post-Survey (N = 12)		df	t	p
	M	SD	M	SD			
Self-Efficacy	3.83	0.61	3.66	0.56	30	1.12	0.53
Pedagogical Knowledge	3.65	0.52	3.33	0.40	30	-0.7	0.14
Willingness	3.09	0.82	2.88	0.78	30	-2.9	0.56
Professional Action Competence	3.73	0.44	3.40	0.34	30	-0.70	0.08

