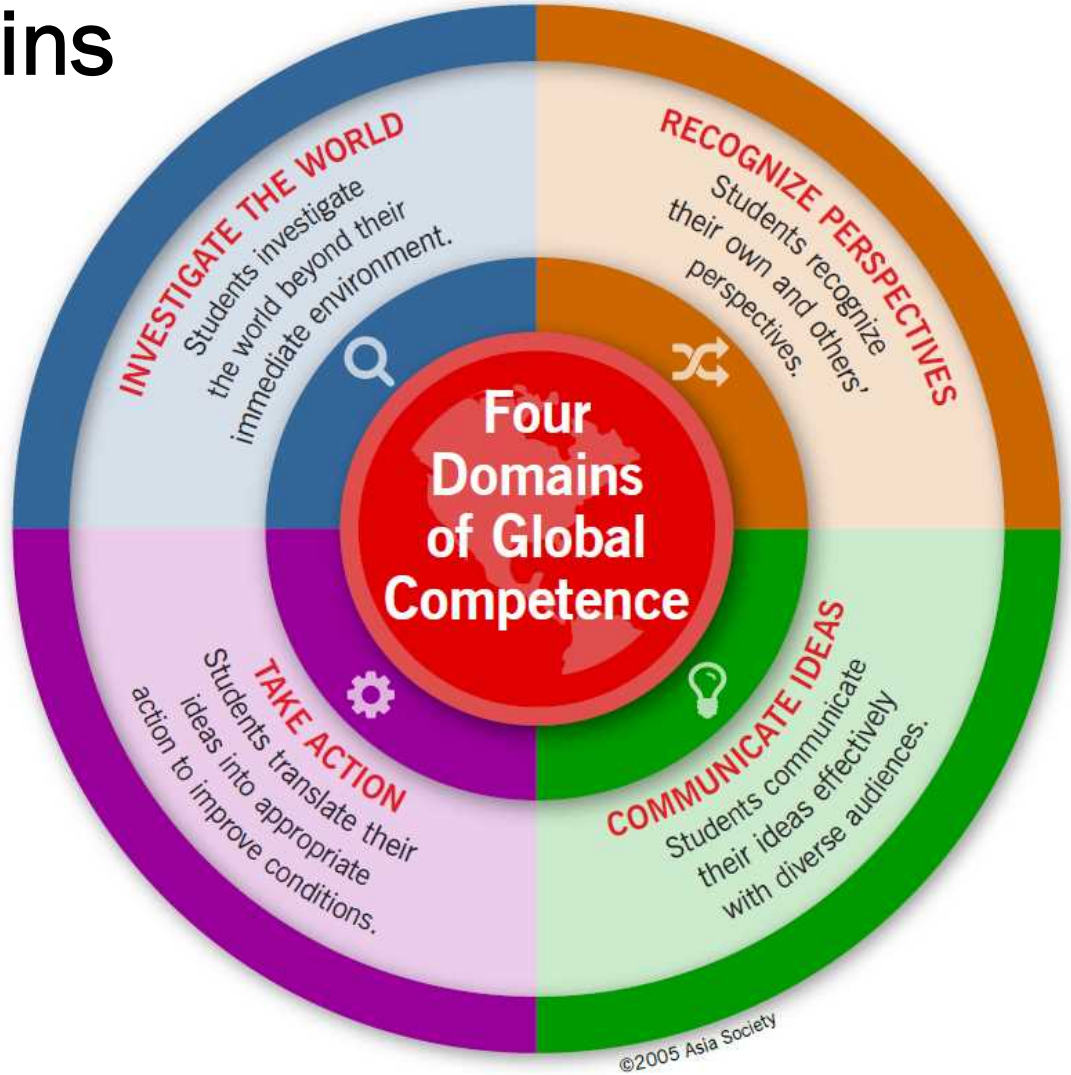
Asia Society | Center for Global Education

Developing Global Competence through Science Education

19th OECD/Japan Seminar

The Four Domains of Global Competence



GPS Performance Outcomes

English Language Arts

PERFORMANCE OUTCOMES

History/Social Studies

PERFORMANCE OUTCOMES

Mathematics

PERFORMANCE OUTCOMES

World Language

PERFORMANCE OUTCOMES

Science

PERFORMANCE OUTCOMES

Arts

PERFORMANCE OUTCOMES

Global Leadership

PERFORMANCE OUTCOMES

Performance Outcomes

Asia Center for Global Education

GRADUATION PERFORMANCE SYSTEM

grade 12

Science

PERFORMANCE OUTCOMES

Investigate the World

What is the evidence that the student uses scientific procedures and disciplines to investigate natural and/or human global phenomena?

- Asks specific testable scientific (testable) questions about a significant global science issue. Questions build on an evaluation of prior interpretations of evidence, a model, engineering design, or the premise of an argument.
- Develops a directional hypothesis that specifies what happens to a dependent variable when an independent variable is manipulated.
- Develops and explains a clear and logical research thesis that clearly builds on up-to-date scientific evidence drawn from credible sources.
- Gathers and analyzes relevant background information from primary and secondary sources representing domestic and international perspectives. Evidence is directly related to a global issue that either supports or refutes the hypothesis or research thesis.
- Uses multiple theories and/or develops multiple models related to a scientific question on a global issue. Evaluates the credibility or limitations of each theory or model, citing evidence for the best-fit theory and/or model.
- Designs a "fair test" experiment identifying the controlled, independent, and dependent variables. Identifies and evaluates the effect of confounding variables on design; and considers limitations on the precision of the data and refines the design. Selects appropriate methods and tools to collect, record, analyze, and evaluate data and analyzes the limitations of the methods and/or tools.
- Evaluates different patterns or relationships in the research claims or data with accurate mathematical or statistical analysis and draws logical, specific conclusions about the scientific question, hypothesis or research thesis. Evaluates impacts of error and inconsistencies in the data or research.

Recognize Perspectives

What is the evidence that the student interprets and discusses scientific data in the context of complex global systems?

- Expresses and explains a clear personal perspective on a global issue and analyzes how it has been influenced or changed by science.
- Analyzes and explains the perspectives and cultural experiences of multiple scientists with competing views on the same global issue.
- Explains a global issue, using information about relevant context(s) to understand the issue beyond the science context, and identify implications for addressing the issue.
- Evaluates different patterns or relationships in the research claims or data with accurate mathematical or statistical analysis and draws logical, specific conclusions about the scientific question, hypothesis or research thesis. Evaluates impacts of error and inconsistencies in the data or research.
- Poses new questions with clear relevance to the research findings.

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GRADUATION PERFORMANCE SYSTEM

grade 12

Science

RUBRIC

Investigate the World

What is the evidence that the student uses scientific procedures and disciplines to investigate natural and/or human global phenomena?

	EMERGING	DEVELOPING	PROFICIENT	ADVANCED
Ask Questions SCI.12.INV.1	Asks scientific testable questions about a global issue. Questions build on and challenge existing evidence (data sources), a model, an engineering design, or premise of an argument.	Asks scientific testable questions about a global issue. Questions build on an evaluation of existing evidence (data sources), a model, engineering design, or the premise of an argument.	Asks specific testable scientific questions about a significant global issue. Questions build on an evaluation of prior interpretations of evidence (data sources), a model, engineering design, or the premise of an argument.	Asks innovative testable scientific questions about a significant global science issue. Questions build on a critical evaluation of prior interpretations of evidence (data sources), a model, engineering design, or the premise of an argument.
Develop a Hypothesis (Use with Experimental Tasks) SCI.12.INV.2	Develops a hypothesis identifying key variables to be investigated and the relationships between the variables.	Develops a hypothesis identifying key variables to be investigated, the relationships between the variables, and provides a rationale.	Develops a directional hypothesis that specifies what happens to a dependent variable when an independent variable is manipulated.	Develops a directional hypothesis that specifies what happens to a dependent variable when an independent variable is manipulated and provides a rationale.
Develop a Research Thesis (Use with Research Tasks) SCI.12.INV.3	Develops a research thesis that reflects prior scientific evidence from sources.	Develops a clear research thesis supported by prior scientific evidence from credible sources.	Develops and explains a clear and logical research thesis that clearly builds on up-to-date scientific evidence drawn from credible sources.	Develops and explains a clear, logical, and innovative research thesis that weighs and synthesizes the most important and up-to-date scientific evidence drawn from credible sources.

Asia Center for Global Education

GRADUATION PERFORMANCE SYSTEM

grade 12

Science

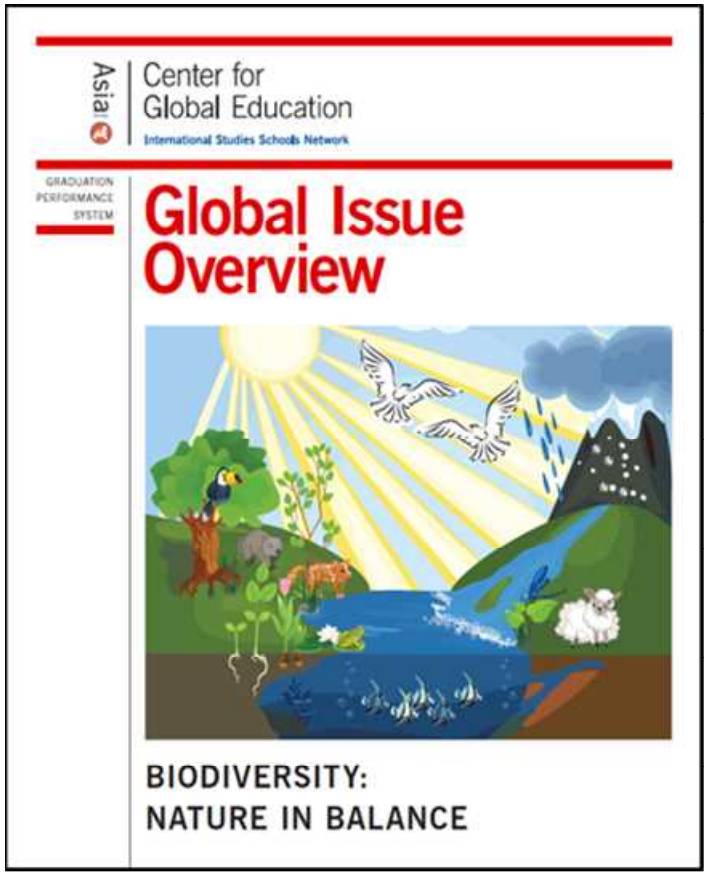
I CAN STATEMENTS

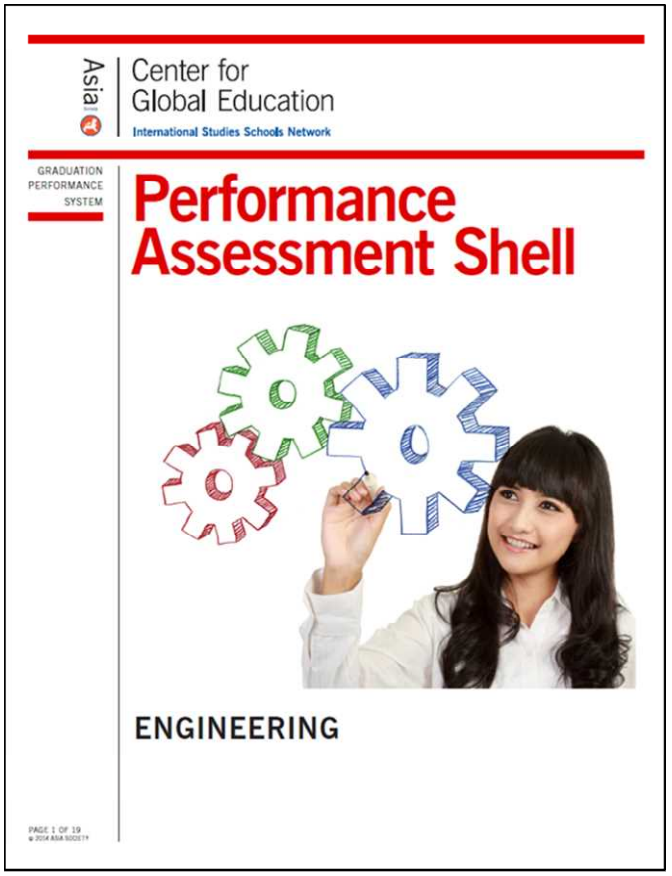
Investigate the World

What is the evidence that the student uses scientific procedures and disciplines to investigate natural and/or human global phenomena?

PERFORMANCE OUTCOME	I CAN STATEMENT
Asks specific testable scientific (testable) questions about a significant global science issue. Questions build on an evaluation of prior interpretations of evidence, a model, engineering design, or the premise of an argument.	I can ask specific, testable scientific questions about a significant global science issue. This means my questions build from my evaluation of prior interpretations of evidence, a model, engineering design, or the premise of an argument
Develops a directional hypothesis that specifies what happens to a dependent variable when an independent variable is manipulated.	I can develop a directional hypothesis. This means my hypothesis specifies what happens to a dependent variable when an independent variable is manipulated.
Develops and explains a clear and logical research thesis that clearly builds on up-to-date scientific evidence drawn from credible sources.	I can develop and explain a clear and logical research thesis. This means it clearly builds on up-to-date scientific evidence drawn from credible sources.
Gathers and analyzes relevant background information from primary and secondary sources representing domestic and international perspectives. Evidence is directly related to a global issue that either supports or refutes the hypothesis or research thesis.	I can gather relevant background information from primary and secondary sources. This means my sources need to represent domestic and international perspectives. It also means my evidence is directly related to a global issue that either supports or refutes the hypothesis or research thesis. I can also analyze this evidence. This means I can identify what's important, and how it applies to my hypothesis or thesis.
Uses multiple theories and/or develops multiple models related to a scientific question on a global issue. Evaluates the credibility or limitations of each theory or model, citing evidence for the best-fit theory and/or model.	I can use multiple theories related to a scientific question on a global issue. This means I can refer to various perspectives on the same question or issue. Or I can develop multiple models related to a scientific question on a global issue. This means I can identify more than one way to test this question or issue. I can also evaluate the credibility or limitations of each theory or model.

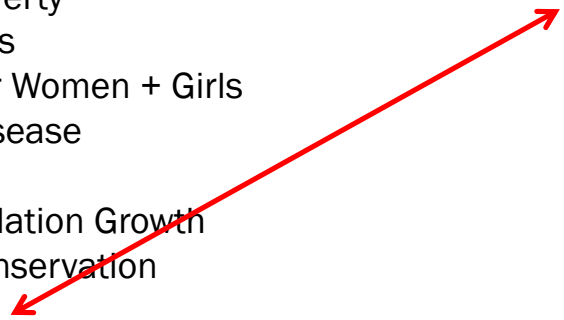
Global Issues Overviews and Performance Assessment Shells





Global Issue Overviews

Environment + Sustainability
Hunger + Poverty
Human Rights
Education for Women + Girls
Infectious Disease
Clean Water
Human Population Growth
Resource Conservation
Biodiversity
Clean Energy
Income Inequality
Sustainable Economies



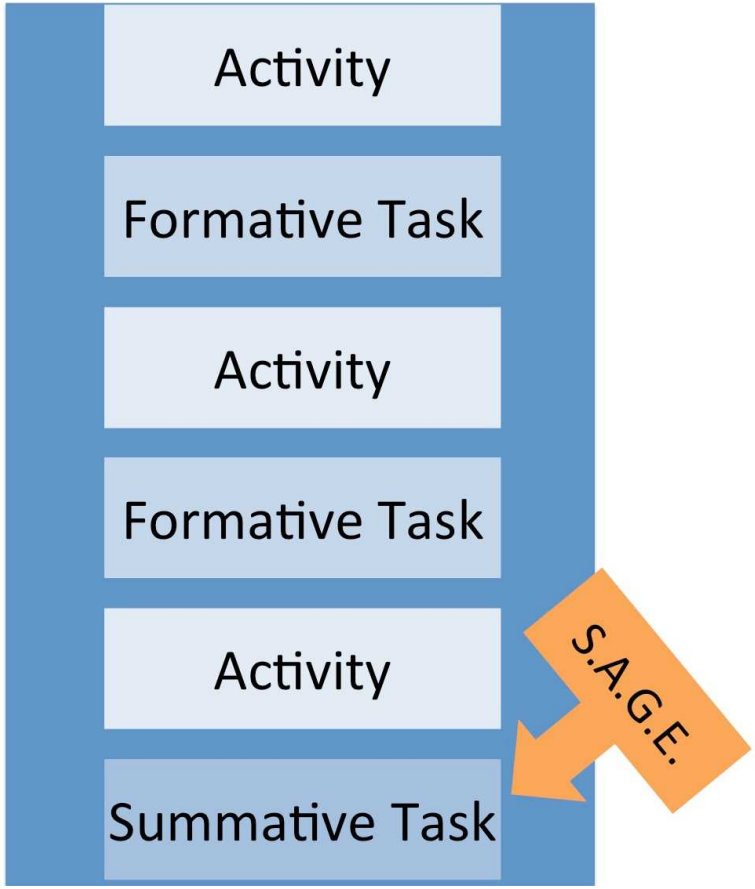
Performance Assessment Shells

Digital Project
Engineering
Community Action or Public Service
Develop a Business Plan
Position Paper
Infographics
Public Speaking
Event Planning
Digital Stories
Civic Responsibility
Art Then and Now
Cost/Benefit Analysis

Project Summative Task: *Students will design an engineering project addressing issues of biodiversity.*

The SAGE Framework

High-Quality GPS Curriculum Module



Performance Assessment Storyboard Template

Grade Level	12th Grade *Students will design an engineering project addressing issues of biodiversity.*
Performance Assessment	Engineering
Global Issue	Biodiversity: Nature in Balance
Enduring Understandings	• Biodiversity includes all the plants, animals and microorganisms in an ecosystem • Biodiversity describes the interrelationship between organisms in an environment
Essential Questions	• Why should we be concerned about biodiversity? • How can we identify and evaluate threats to • biodiversity • How can we design solutions to protect biodiversity?

Performance Outcome	Emerging	Developing	Proficient	Advanced
Analyze, Integrate and Evaluate Sources	Analyzes and integrates evidence from sources to develop a response to a global question; demonstrates understanding of the issue.	Analyzes and integrates evidence from sources to develop a well-supported response to a global question; demonstrates an informed understanding of the issue.	Analyzes, integrates, and evaluates sources of evidence to develop a coherent, well-supported response to a global question; demonstrates thorough understanding of the issue.	Analyzes, integrates, and evaluates sources of evidence to develop a coherent, well-supported, and original response to a global question; demonstrates a thorough and complex understanding of the issue.
Understand Contexts	Identifies an alternative perspective on a situation, event, issue, or phenomenon, and makes a connection to a contextual factor, such as access to knowledge, technology, or resources.	Explains various perspectives or interpretations of a situation, event, issue, or phenomenon, and reflects an understanding of different contexts, such as access to knowledge, technology, or resources.	Explains how different contexts, such as access to knowledge, technology, and resources, influence perspectives and interpretations of a situation, event, issue, or phenomenon.	Explains how different contexts, including access to knowledge, technology, and resources influence perspectives through a multi-faceted, complex interpretation of a situation, event, issue, or phenomenon.
Communicate with Diverse People	Demonstrates an understanding of a specific audience by communicating and collaborating using verbal and non-verbal behavior, languages, and strategies that are generally appropriate to the specific audience.	Demonstrates an understanding of a specific audience by communicating and collaborating using verbal and non-verbal behavior, languages, and strategies that are appropriate to the specific audience.	Demonstrates an understanding of diverse audiences by communicating and collaborating using verbal and non-verbal behavior, language, and strategies that are appropriate to specific audiences.	Demonstrates a precise and detailed understanding of diverse audiences by communicating and collaborating skillfully and effectively using verbal and non-verbal behaviors, language, and strategies that are customized to specific audiences.

Formative Task 1:	The Importance of Engineering
The Ask	What is engineering, and why is it important? Students will work toward a broad shared definition of engineering that demonstrates how it appears in everyday life. The lesson will demystify engineering to show it as an accessible practice to all, and not just to those who are pursuing a technical career.
Time Frame	1-2 Hours
Global Leadership Performance Outcome	Analyze, Integrate and Evaluate Sources
Learning Activities	**Define engineering and establish its importance** Students will look at the definition of engineering and establish how it is a problem-solving mindset rather than just a technical one and why it is important for all people to think like engineers. Students should learn that engineering is a process of defining a result, designing and planning a solution, building the solution, testing it against the desired result, and proposing improvements to improve on the result. **Observe an unfamiliar object and speculate about its uses** Students will observe an unfamiliar object and speculate about its possible uses based on the object's physical characteristics. Objects can be supplied by the teacher, or students can find and photograph objects themselves by going to antiques shops, thrift stores, or unfamiliar places such as the school kitchen or woodworking shop.

Summative Task:	Students will design an Engineering Project that will help address an issue of biodiversity
The Ask	How does your engineering project help solve a problem? You will explain to an authentic audience how your product will help your community/nation/world through either a position paper or an advertising campaign.
Time Frame	7-9 hours
Global Leadership Performance Outcome	Analyze, Integrate and Evaluate Sources Understand Contexts Communicate with Diverse People Identify Opportunities for Personal or Collaborative Action
Learning Activities	**Engineer a solution to a problem** Students will work as a team to engineer their object as a means of solving a problem. They should first define a desired result for the object, then obtain or design a blueprint and specifications for the object, and then use these documents to build the object. **Analyze Results and Refine** Students will learn that engineering is an iterative process that must include testing, analysis, and improvement. They should put their object to its intended uses and observe how well it works, then brainstorm and document ideas for improvement. **Write an informational paper of how their engineering solution will help** Students will write a 1-3 page paper outlining what their object does, how it is used, and what result it delivers. The paper must include at least one connection to an issue with global significance.