Short Performance Assessment (SPA)

Performance Expectation: **5-ESS2-1**

Grade Level: **Fifth Grade**

Adapted from SNAP[1]

Title	**Water Water Everywhere and Not a Drop To Drink**		
Designed by	**David, Susan, and Sean**	Course(s)	**Grade 5**

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Performance Expectation	**5-ESS2-1**: Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. **Clarification Statement**: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system. **Assessment Boundary**: Assessment is limited to the interactions of two systems at a time.

Science and Engineering Practice	**Developing and Using Models** • Develop a model using an example to describe a scientific principle.
Disciplinary Core Ideas	**ESS2.A: Earth Materials and Systems** • Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.
Crosscutting Concept	**Systems and System Models** • A system can be described in terms of its components and their interactions.

Student Performance	1. Components of the model 2. Relationships 3. Connections

[1] The Short Performance Assessment (SPA) and the Assessment Rubric adapted from the Stanford NGSS Assessment Project http://snapgse.stanford.edu/

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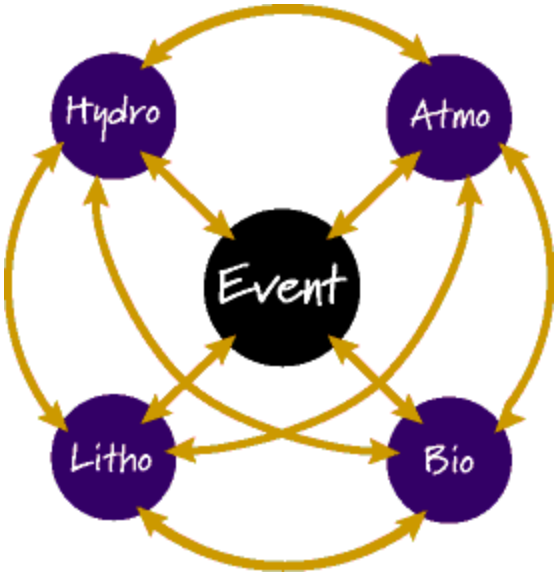
1. Prompt: Yes
2. Stimuli: Yes
3. Stimuli: No - need to add more stimuli, such as make it a local connection, such as a rainstorm. Add a map and a photograph. Have a text box with an example of a major storm. We could have a video lead in, and then use the images on the STEM Gauge.
4. Prompt: content - yes
5. Prompt - models - No, but it never says system. Add that. System could be water cycle, digestion system. Add, “Draw and label system model.”
6. Prompt - progressions - No. grade appropriate progressions. Include the language from the purple, orange, and green boxes (practices, core ideas, concepts) Include word box on formative, but not summative. - Not there because it doesn’t have the bullets from the boxes
7. Prompt - graphic organizers. No. What would you want? Draw a box so the kids know where to make the model.
8. Entire assessments - No. Real data or photos.
9. Phenomenon - are kids figuring out something? Yes.
10. Phenomenon - authentic and interesting? No.
11. Phenomenon. Novel. Shouldn’t be able to memorize and regurgitate. DOn’t waste good phenomenon on summative. Switch spheres. During unit expand to teaching all 4 spheres.

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Background Knowledge Activity:
[Earth's Spheres Craft Activity]
[Link to Background Knowledge Video]
[Another Cool Wheel about Earth's Spheres by NASA]

Short Performance Assessment

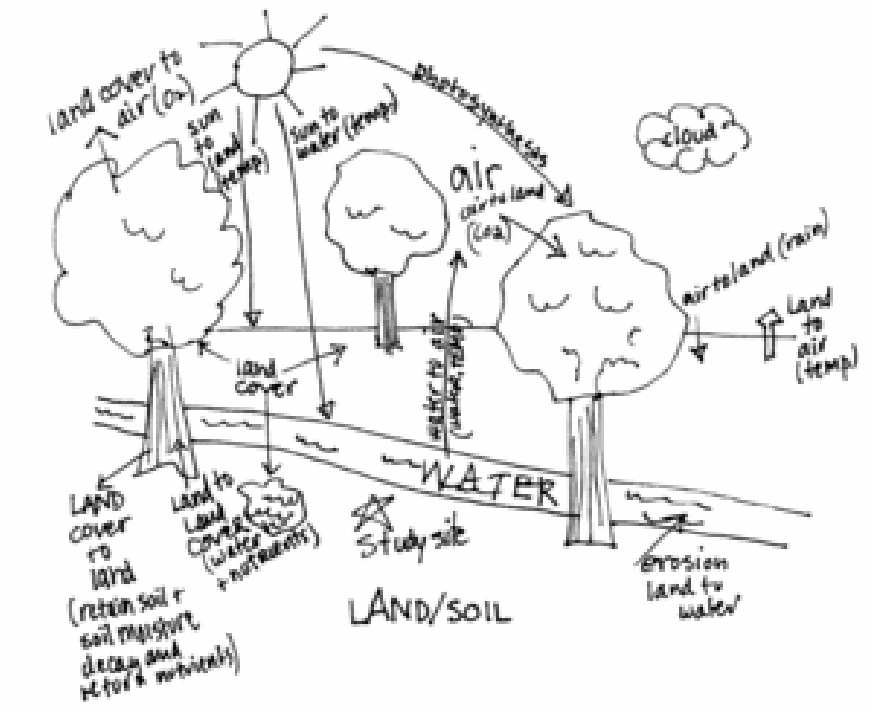
Phenomenon



The Earth's Systems are constantly interacting with each other. For example, how does a tree (biosphere) interact with the soil in which its roots grow (geosphere) or with the rain (atmosphere)?

Watch the video below. Take notes and think about how the Earth's systems that you see, and how they interact. Talk to your group. Draw a model like the example below about the interaction of the Earth's systems that are represented in the video.
[Phenomenon Video- Rain in Singapore]

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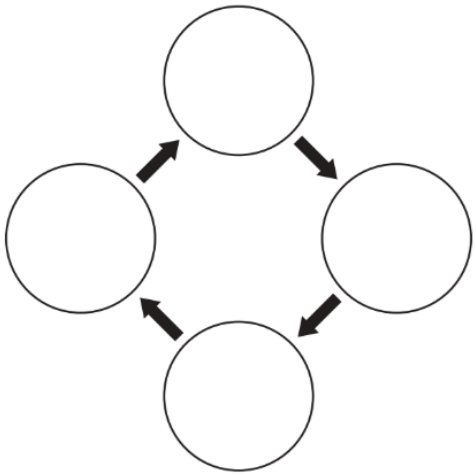


Singapore was originally a rainforest biome. As a result, it rains almost every day. The water cycle is part of the hydrosphere. Carly wants to use a cycle diagram as a model to show that the different Earth systems affect one. Carly writes down four facts she learned from Meteorology.

- Cooled water vapor forms clouds.
- Water on the ocean's surfaces warms.
- Heavy water drops fall as rain.
- Water vapor rises in warm air.

A. Place one fact in each circle of the cycle diagram model to show the order that water moves between Earth system.

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B. Identify the two Earth systems that water moves between in the model.

Storm on beach footage https://www.youtube.com/watch?v=G_kc_VR30VI

Stimulus

Prompt
Question 1 Question 2 etc...

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Name_____

(insert Title of assessment here)

(insert Phenomenon and Stimuli here)

(insert Prompt here)

Question 1

Question 2

etc...

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Assessment Rubric* -				
	Emerging	Developing	Approaching	Excelling
Create a model to represent a system	Working with others, I can develop a simple diagram that shows the main parts of a natural or designed system. **In my model, I can represent some of the important details that I observe about the system that I am modeling**	I can develop a simple **model** (e.g. diagram, three-dimensional physical structure) **that illustrates** a natural or designed system. **I can select materials or tools that help me accurately represent the system.**	II can develop a simple model that illustrates a natural or designed system. I can select appropriate materials or tools that will help me accurately represent the system.	I can develop a model (e.g. diagram, three-dimensional physical structure, computer simulation, analogy, mathematical formula) - for a natural or designed system that accurately illustrates system components and how they interact and effect one another. I can select materials (when applicable) or digital tools that enable me to represent the system(s) and system interactions with accuracy and precision. **I can clearly explain my rationale for the materials or tools I have chosen and how they relate to the type of evidence that supports the design of the model.** **I can identify the specific assumptions and approximations on which the model is based.** **I can explain how my model illustrates applications of one or more scientific principles or concepts.**
Sample student responses				

Assessment Rubric* - Question 2				
	Emerging	Developing	Approaching Proficiency	Excelling

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Description of performance				
Sample student responses				

Insert additional Assessment Rubrics (if needed) here.

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Short Performance Assessment (SPA)

Performance Expectation: **5-ESS2-2**

Grade Level: **Fifth Grade**

Adapted from SNAP[2]

Title			
Designed by	**Jess Harrison, Louise E. Donaghey**	Course(s)	**Science**

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Performance Expectation

5-ESS2-2: Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.(Scale, Proportion, and Quantity)

Clarification Statement: none
Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.

Science or Engineering Practice	Disciplinary Core Idea(s)	Crosscutting Concept
Using Mathematics and Computational Thinking	ESS2.C: The Roles of Water in Earth's Surface Processes	Scale, Proportion, and Quantity

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Short Performance Assessment

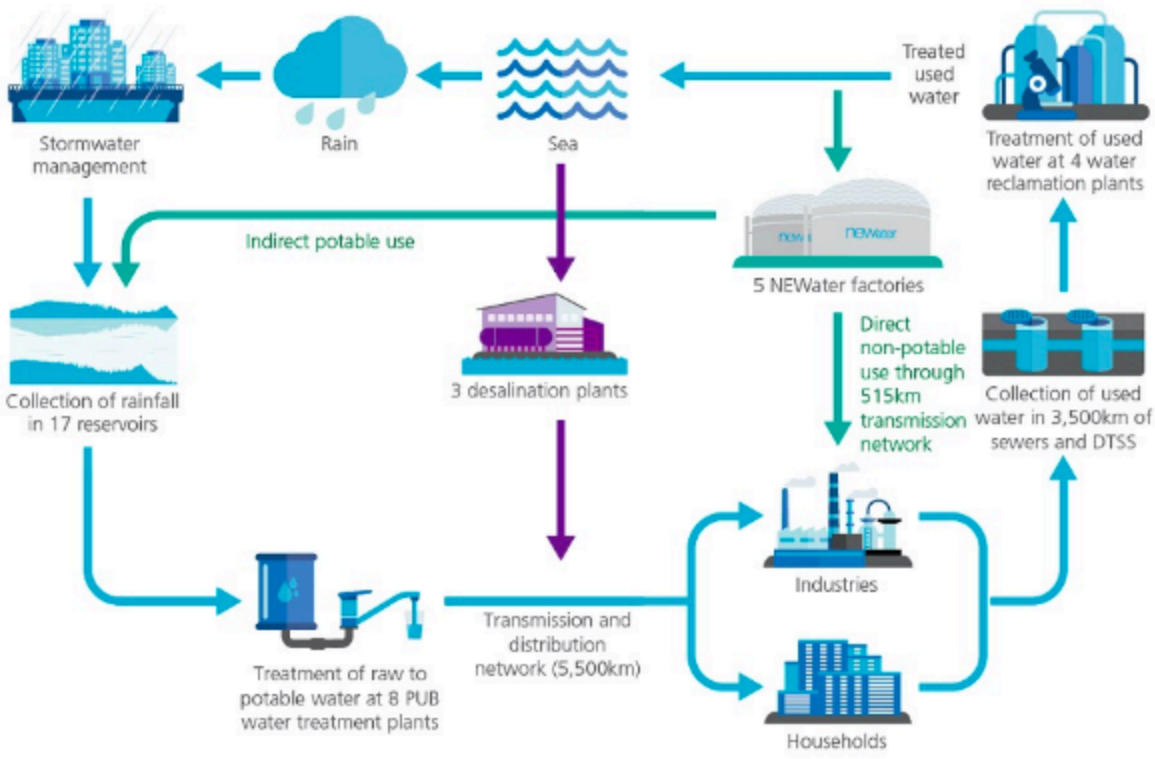
Phenomenon

Mr. Hoss learns that 51.7% percent of Singapore's freshwater is imported from Malaysia. He wants to know where the rest of Singapore's freshwater comes from.

Freshwater Sources In Singapore

Source of Freshwater	Percentage
Imported from Malaysia	51.7
NewWater (Reclaimed)	26.4
Desalinated Water	%

Stimulus



What is the current fresh water availability in Singapore by year to see how much we are consuming from 2018, 2017, 2016 data set. Link: pub.gov.sg

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Prompt
Mr. Hoss forgot to include the percentage of desalinated water in the table. He knows the total percentages of water in the table should equal 100 percent. a. Determine the percentage of desalinated water based on the other data in the table. b. Create a graph that compares the percentages of Singapore's freshwater sources using the data in the table. c. What would Singapore need to do if Malaysia cut off their water exports to Singapore? How will the people of Singapore be able to survive if their water supply is cut off from Malaysia?

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(student friendly form - remove this heading when done)

Name_____

(insert Title of assessment here)

(insert Phenomenon and Stimuli here)

(insert Prompt here)

Question 1

Question 2

etc...

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Assessment Rubric* **5-ESS2-2**				
	Emerging	Developing	Proficiency	Excelling
Analyzing and Interpreting Data	I can describe the patterns I see in a data set provided to me. **I can explain or show what I think it means, making connections to my own experience, ideas, or knowledge about the topic**	I can identify and describe patterns **and outliers in a data set.** **I can use reasoning and contextual information to explain what the data means**	I can identify patterns and outliers in **one or more sources of data**. I can use reasoning, **math skills**, and contextual information **to draw inferences about the data and explain phenomena**.	**I can analyze data sets involving linear or nonlinear relationships, and I can explain relationships between variables using details about the data**, including observed patterns or outliers. I can use reasoning, math skills, or contextual information to draw inferences about the data to support an evidence-based claim. **When applicable, I can compare multiple data sets and determine similarities and differences between and among the data**.
Sample student responses				

Assessment Rubric* - Question 2				
	Emerging	Developing	Approaching	Excelling

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			Proficiency	
Description of performance				
Sample student responses				

Insert additional Assessment Rubrics (if needed) here.

Short Performance Assessment (SPA)

Performance Expectation: **5-ESS3-1**

Grade Level: **Fifth Grade**

Adapted from SNAP[3]

Title	**Water Water Everywhere, and not a drop to drink.**		
Designed by	**Paul, Cathy, Jo**	Course(s)	

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Performance Expectation

[3] The Short Performance Assessment (SPA) and the Assessment Rubric adapted from the Stanford NGSS Assessment Project http://snapgse.stanford.edu/

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5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Clarification Statement: none
Assessment Boundary: none

Science or Engineering Practice	Disciplinary Core Idea(s)	Crosscutting Concept
Obtaining, Evaluating, and Communicating Information	ESS3.C: Human Impacts on Earth Systems	Systems and System Models

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Short Performance Assessment

Phenomenon

Bali Diver films deluge of plastic waste

https://www.youtube.com/watch?time_continue=9&v=ArYLGNe-jCA

Stimulus

Source 1: Plastic-eating bacteria discovered by student could help solve global pollution crisis. (2018, June 29). Retrieved September 27, 2018, from https://www.independent.co.uk/

A student may have found a solution to one of the world's most urgent environmental crises – breeding bacteria capable of "eating" plastic and potentially breaking it down into harmless by-products. The microbes degrade polyethylene terephthalate (PET) – one of the world's most common plastics, used in clothing, drinks bottles and food packaging.

Morgan Vague, who is studying biology at Reed College in Oregon, said the process, if sped up, could play a "big part" of solutions to the planet's plastic problem, which sees millions of tonnes dumped in landfill and oceans every year. Taking her samples back to college in Portland, Oregon, Ms Vague began testing around 300 strains of bacteria for lipase, a fat-digesting enzyme potentially capable of breaking down plastic and making it palatable for the bacteria. She identified 20 that produced lipase, and of those three that boasted high levels of the enzyme. Next she put the three microbes, one of which appears to have been previously undiscovered, on a forced diet of PET she cut from strips of water bottles. She was stunned to find the bacteria worked to digest the plastic.

Source 2: How can we encourage people to recycle plastic trash?
The Colombian company Conceptos Plasticos has been turning plastic into construction materials, and building homes with them since 2014. Their approach is both environmentally friendly and socially conscious, aiming to provide housing to the needy, particularly those who have been forced to flee rural areas due to dangerous gangs.
The notion of using the recycled plastic to build homes for the needy came from Oscar Mendez, a 34-year-old architect and one of the co-founders of the company, which currently employs a dozen people. About 35 percent of Colombian families didn't have housing or had insufficient housing. It's a particularly serious problem in rural areas, where a large number of inhabitants have been forced to leave their homes because of the fighting.
Additionally, 750 tonnes of plastic are thrown in the dump every day in Bogotá, Columbia, according to the authorities. People now sort through the trash in order to recycle the plastic, and earn money for collecting it to build the lego plastic blocks.
(Source: https://observers.france24.com/en/20160815-colombia-building-homes-recycled-plastic-displaced)

Lego Plastic Blocks Used to Build Homes

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Source 3: Cleanbodia

On average, Cambodians use five to ten plastic bags every day, contributing to a serious waste problem in the country. Kai Kuramoto, founder of Cleanbodia, is attempting to change that by introducing an alternative solution: a biodegradable bag made from cassava starch.

Our **biodegradable bags** are made by a unique, technical process which combines a renewable resource - cassava starch - with a fossil fuel. When disposed of, the starch degrades naturally within just a few months and produces bacteria which begins to directly attack the fossil polymer chains, drastically reducing degradation from hundreds of years to about 5 years.

We make our **compostable bag**s from renewable cassava starch mixed with a biodegradable polymer. Once buried in soil, this material converts into CO_2, H_2O, CH_4, and biomass allowing it to be used as a compostable material. Because our compostable bags contain no fossil-based polymers, they will fully biodegrade in as little as 24 months.

Student Form on Following Page

Prompt

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1-How are plastics impacting one of our Earth's Systems?

2-Research possible solutions from the 3 links provided. Take notes on each topic.

Write to answer the following questions:
a)How are communities using science ideas to protect our Earth's resources and environment?

b)What are the positive effects of that solution on the environment? Any negative effects?

c) Which of these 3 ideas would you choose to help reduce plastic waste in your community? Explain the reasons for your choice and add specific details about how this idea could protect the environment and natural resources in your area.

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Assessment Rubric* - Question 1 (**5-ESS3-1)**				
	Emerging (1pt)	Developing (2pts)	Proficient (3pts)	Excelling (4pts)
Using Sources	With guidance, I can identify 1-2 important details, from all of the sources provided combined, that relates to my research question.	I can identify 1-2 important details, from all of the sources provided combined, that relate to my research question.	I can identify 1-2 important details and combine important information from multiple sources that provide evidence or details to support my specific research question.	I can evaluate, analyze, and interpret 1 - 2+ important details from each of the resources provided, and support my thinking with specific evidence related to my research question.
Application of Learning	With guidance, I can understand how the information given could be used in a different way.	I can understand how the information given could be used in a different way.	I can apply the information that I have learned.	I can apply and build upon the information that I have learned.

Insert additional Assessment Rubrics (if needed) here.

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