|  |  |  |
| --- | --- | --- |
| Performance Expectation: MS-LS1-6  *Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.* | | |
| Learning Goal 1:  Students will develop a model to show how producers make food using energy from the sun. | Learning Goal 2:  Students will construct an explanation to describe the cycling of matter and flow of energy into and out of organisms. | Learning Goal 3: |
| Success Criteria:  Students can identify reactants and products in photosynthesis.  Students can identify where the energy and matter comes from that drives the system.  Students can represent this process by developing and using a model. | Success Criteria:  Students can explain that producers use energy from the sun to create the food that supports the ecosystem.  Students can articulate that the products of photosynthesis can be used in plants and animals to convert stored energy to usable energy using cellular respiration.  Students can describe the relationship between photosynthesis and cellular respiration (connection between reactants and products). | Success Criteria: |

Performance Expectation: \_\_\_MS-LS1-6\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Standards Alignment**

|  |  |  |  |
| --- | --- | --- | --- |
| *Do the learning goals and success criteria fully address each of the dimensions of the performance expectation?* | | | |
|  | **Yes** | **No** | **Rationale** |
| **Disciplinary Core Idea** | x |  | Should you take the storage part in the second LG and highlight orange to fit the DCI? |
| **Science and Engineering Practice** | x |  | Modeling in LG #1  Explanation in LG#2 |
| **Crosscutting Concept** | x |  | LG #1 |

**Other Considerations**

|  |  |  |
| --- | --- | --- |
|  | **+** | **Δ** |
| **The learning goals are reasonable in grain-size.** | Yes. | Yes, but thoughts on splitting up the cycling and flow? Do you plan to assess these both at the same time? |
| **The learning goals are at least two-dimensional.** | Yes. | Yes, but I think that your second learning goal is not really hitting the “constructing explanation” standard in terms of gathering data and interpreting the evidence - is there a way to be more specific about the reasoning piece of this as well? (Page 11 of the Evidence Statements is suuuuper specific on this) |
| **The success criteria are reasonable in grain-size.** | Yes. | Yes |
| **The learning goals/success criteria pass the “evidence statement” filter.** | See Notes. | See comments above. See Success Criteria Evidence statement iv. Is this included in these learning goals? Should this be a separate LG? Have you included the reasoning portion? |

**Other Notes/Feedback:**

Could you get rid of your first LG and incorporate it into the 2nd one? There seems to be a lack of inclusion of animal interactions in your LGs. See evidence statements: Reasoning.

**Task: LS1-6 LG 2**

**Learning Goal:** LS1-6; LG2:*Students will construct an explanation to describe the cycling of matter and flow of energy into and out of organisms.*

|  |  |  |
| --- | --- | --- |
| **DCI** | **SEP** | **CCC** |
| **LS1.C: Organization for Matter and Energy Flow in Organisms.**  *Students will use their constructed models and provided data to explain the role photosynthesis plays in the cycling of matter and flow of energy into and out of organisms.* | **Developing and Using Models:** *Students will use their photosynthesis/cellular respiration models to help them construct explanations.*  **Analyzing and Interpreting Data:** *Students will use provided data to infer that photosynthesis is needed to support ecosystems by converting the sun’s energy into available food.* | **Patterns:** *Students will use data to identify patterns that lead them to understanding that photosynthesis is needed to support ecosystems.*  ***Energy and Matter:*** *Students will see that in a natural system the transfer of energy drives the motion and/or cycling of matter.* |

Student Work Analysis- Trends/Needs/Strategies

Prompt Title: LS 1-6 LG 2

|  |  |  |
| --- | --- | --- |
| TRENDS  What trends did you notice across your data/student work? | NEEDS  Based off the trends identified what do students need? | STRATEGIES  What instructional strategies will address student needs effectively? |
| SEP was lowest number of highs and highest number of lows  Students did not understand what question 3 was asking, needed it to be reworded by teacher  CCC was strongest statistically overall, but DCI had lowest number of “low” scores | Need to state “use data” in each question, not just in directions  Need to restate question 3 to provide more clarity  Needs to address the idea of energy more effectively | Restate “use data” multiple times in questions to remind students or when going over questions/directions emphasize the use of numbers and data from the chart when answering the questions.  Put another column in chart with”?” in each row or reference Environments A-E in question 3; restate the question in another way to provide clarity for students  Add another question about energy to the CEA.  Discuss LG1 models as a class in terms of energy flow (where energy comes from and where it goes). |
| PROMPT REVISION  What could be changed about the task/prompt to make it more effectively elicit student thinking?   1. Restate “use data” multiple times in the prompt and questions. 2. Add an additional column at the end of the chart with the title “Mass of secondary consumers” with a question mark in each row. 3. Add additional question about energy. | | |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Directions: Using evidence from the table and your photosynthesis/cellular respiration model, read and answer the questions below. Be sure to explain your reasoning.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Environment | Average Annual Rainfall (inches) | Average Daily Hours of Sunlight | Mass of primary consumers per square meter (grams) | Mass of secondary consumers per square meter (grams) |
| A | 0 | 3 | 0 | ? |
| B | 10 | 6 | 0.86 | ? |
| C | 20 | 8 | 1.75 | ? |
| D | 40 | 12 | 3.23 | ? |
| E | 60 | 0 | 0 | ? |

1. How does the average annual rainfall and average hours of sunlight affect the mass of primary consumers?
   1. As rainfall and sunlight increase, the mass of primary consumers decreases.
   2. As rainfall and sunlight increase, the mass of primary consumers increases.
   3. There is no relationship between rainfall, sunlight, and mass of primary consumers.
   4. The mass of primary consumers increases with rainfall only.
2. Why does the amount of rainfall and sunlight affect the mass of primary consumers? Use data from the table in your answer.

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1. If there was a fourth column for secondary consumers, which environment (A-E) would most likely have the highest mass? Explain your reasoning.

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1. Where does the energy from each environment come from and what happens to the energy when a plant is consumed?

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