

Exemplar Science Assessments—Level 3

Level 3—Exemplar One

You are out hiking and come across a plant that you have never seen before. It is bluish in color instead of green and you become curious about whether it is undergoing photosynthesis. Given the knowledge you have from biology class, you decide to collect some data and compile it in the following tables. Based on *both* Table 1 and Table 2, answer the research question: Does the blue plant undergo photosynthesis? (**Learning target 1**)

Table 1: Glucose Over Time

	0 min.	1 min.	2 min.	3 min.	4 min.	5 min.	6 min.	7 min.	8 min.
Dry Mass (Measure of Glucose) (mg)	10	12	13	15	17	19	22	24	27

Table 2: Carbon Dioxide Levels Over Time

	0 min.	1 min.	2 min.	3 min.	4 min.	5 min.	6 min.	7 min.	8 min.
Amount of CO₂ (ppm)	210	206	203	199	196	193	188	187	184

Claim: *Does*
Yes, it has photosynthesis.

Evidence:
At 0 minutes the plant starts with 10 glucose. Then in 8 mins it goes up to 27. Then in table 2 the CO₂ levels go from 210 in 0 mins down to 184 in 8 mins.

Reasoning:
In photosynthesis the plant needs sunlight, water and CO₂. In the process it makes glucose and oxygen. The CO₂ levels going down from 210 in 0 min to 184 in 8 mins shows the plant is absorbing the CO₂ just like it would in photosynthesis. Also the amount of glucose increased from 10 in 0 mins to 27 in 8 mins. That is what the plant would do if it underwent photosynthesis. So the plant *does* have photosynthesis.

Yes! This is great! Coming in for help really paid off.

Learning target 4: Constructing Scientific Explanations

1	2	3	4
I can construct an explanation for a scientific phenomenon in familiar contexts with support.	I can construct an explanation for a scientific phenomenon using some essential components in familiar contexts.	I can construct an explanation for a scientific phenomenon using all essential components in familiar contexts.	I can construct an explanation for a scientific phenomenon using all essential components in unfamiliar contexts and/or make connections to related science concepts.

Essential Components

- Claim: Accurate, concise, answers the questions
- Evidence:
 - Data specifics and context
 - Sufficient and accurate
 - Trends, patterns, or comparisons
- Reasoning:
 - Describes the significance or meaning of trends or patterns
 - Explains why the data count as evidence to support the claim
 - Includes one or more scientific principles that are important to the claim and evidence

Level 3—Exemplar Two

You are out hiking and come across a plant that you have never seen before. It is bluish in color instead of green and you become curious about whether it is undergoing photosynthesis. Given the knowledge you have from biology class, you decide to collect some data and compile it in the following tables. Based on *both* Table 1 and Table 2, answer the research question: Does the blue plant undergo photosynthesis? (**Learning target 1**)

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Amount of CO₂ (ppm)	210	206	203	199	196	193	188	187	184

Claim:

The blue plant does undergo photosynthesis.

Evidence:

The amount of glucose at 0 minutes is 10 mg. The amount of carbon dioxide at 0 minutes is 210 ppm. At 8 minutes the amount of glucose went up to 27mg and the carbon dioxide level lowered to 184ppm.

Reasoning:

when a plant undergoes photosynthesis it absorbs CO₂ through its leaves. It takes CO₂ out of the air. Also, a plant produces nutrients called glucose through photosynthesis. Since the CO₂ levels are decreasing and glucose levels are rising, it highlights the blue plant that's undergoing photosynthesis.

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Level 3—Exemplar Three

You are out hiking and come across a plant that you have never seen before. It is bluish in color instead of green and you become curious about whether it is undergoing photosynthesis. Given the knowledge you have from biology class, you decide to collect some data and compile it in the following tables. Based on *both* Table 1 and Table 2, answer the research question: Does the blue plant undergo photosynthesis? (**Learning target 1**)

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Table 2: Carbon Dioxide Levels OverTime

	0 min.	1 min.	2 min.	3 min.	4 min.	5 min.	6 min.	7 min.	8 min.
Amount of CO₂ (ppm)	210	206	203	199	196	193	188	187	184

Claim:

The blue plant does undergo photosynthesis.

Evidence:

At 0 mins the plant starts off with 210 CO and 10mg of glucose. 8 mins later the plant loses CO and ends up with 184. At that same time, the amount of glucose grows by 17mg and ends up with 27mg of glucose.

Reasoning:

During photosynthesis CO₂ (used in this), the reactants sunlight and water go into the plant, and oxygen and glucose (used in this) leave the plant. The table shows that during 8 mins, CO₂ goes into the plant and the total amount decreases, and right then the amount of glucose increases. This is the process of photosynthesis.

Learning target 4: Constructing Scientific Explanations

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