

Tool 5 Template Example – 3D Assessment

Evaluate: Experiences in the Evaluate phase encourage students to assess and reflect on their conceptual understanding and use of the science and engineering practices. The Evaluate phase includes both an activity and performance task that together allow teachers to evaluate student progress toward achieving the performance expectation(s).

Evidence of Learning Specifications

1. Construct an explanation that predicts:
 - a. Consistent patterns of interactions between living and non-living parts of ecosystems
 - b. Consistent patterns of types of interactions including competitive, predatory, and mutually beneficial
2. Construct an argument that:
 - a. Is supported by empirical evidence of interactions within the ecosystem (a type of Earth System) and scientific reasoning
 - b. Supports or refutes how increases in human population cause negative impacts on the Earth

Alignment with EoLS	Performance Task to address EoLS List questions/prompts	Ideal Student Responses Use to guide rubric development
<p>EoLS 1b - Construct an explanation that predicts:</p> <p>Consistent patterns of types of interactions including competitive, predatory, and mutually beneficial</p>	<p>Graybirds and whitebirds live on North Island. Both types of birds eat the berries of the berry bush.</p> <p>The seeds of the berry bush grow best after the berries are eaten by birds and dropped elsewhere around the island.</p> <p>Whitebirds are also found on nearby South Island. The white birds on South Island eat berries and the nuts of the nut tree.</p> <p>Rats are found on both islands. Berries and bird eggs are favorite foods of the rats.</p> <p>1a. Predict the patterns of interactions between species on North and South Islands. Identify 3 relationships on each island. Use words: competition, predatory-prey, and mutualism. Write a paragraph describing the relationships.</p>	<p>On North Island:</p> <ul style="list-style-type: none"> • <i>A predator-prey interaction between the rats and the birds (or, rats are predators, bird eggs are their prey)</i> • <i>A mutually beneficial interaction (or mutualism) between the birds and the berries</i> • <i>Competition between the two kinds of birds and between the birds and the rats for berries.</i> <p>On South Island:</p> <ul style="list-style-type: none"> • <i>Rats are predators of the whitebird eggs (or rats are predators, bird eggs are their prey)</i> • <i>Rats and whitebirds compete for berries</i> • <i>The whitebirds and berries have a mutually beneficial interaction (mutualism)</i>

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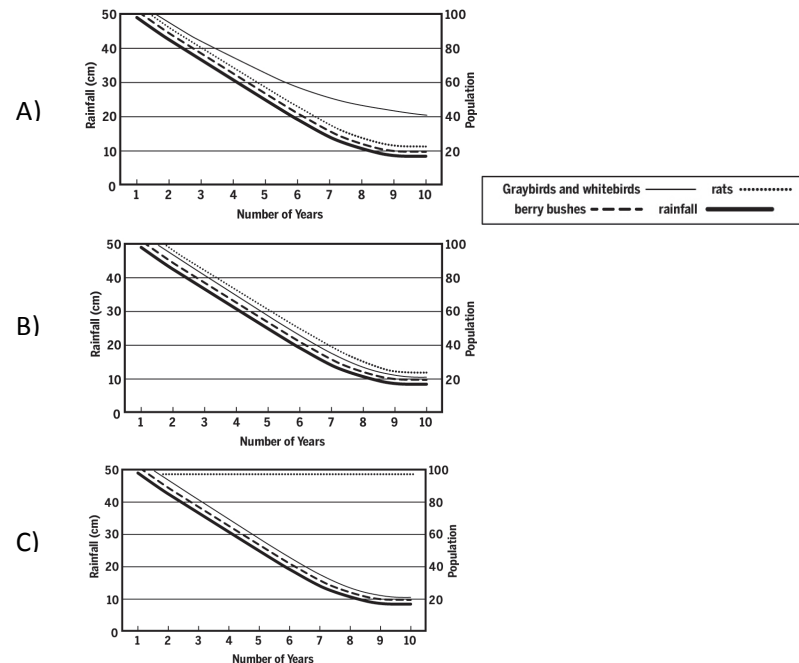
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EoLS 1a - Construct an explanation that predicts:

Consistent patterns of interaction between living and non-living parts of ecosystems

1b. Berry bushes need lots of rainfall. Which graph below best predicts what would happen to the populations on the **North Island** during a 10-year period of decreasing rain. Explain why the other two graphs are not the best predictions of what would happen during the period of decreasing rain.



Answer A) is not correct because the birds should follow the same pattern as the rats and bushes, since birds also eat berries

Answer B) is correct

Answer C) is not correct because rats would decrease as the birds decreased, since rats eat bird eggs

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East Island has had normal rainfall. Like North Island, it has berry bushes, both Graybirds and Whitebirds, and rats, but no nut trees. About 20 years ago, people started living on East Island and began hunting Graybirds for food. Five years ago, the local government decided to reduce bird-hunting by limiting hunting licenses.

EoLS 2a - Construct an argument that:

Is supported by empirical evidence of interactions within the ecosystem (a type of Earth System) and scientific reasoning

EoLS 2b - Construct an argument that:

Supports or refutes how increases in human population cause negative impacts on the Earth

Years Ago	Graybird Population of East	Human Population of East	Number of Hunting Licenses Issued
20	1,742	503	50
15	1,510	631	69
10	1,213	759	70
5	1,298	962	40
present	1,350	1,088	40

2a. Use evidence from the table above to construct a scientific argument that answers the question: “Do increases in human population cause negative impacts on the Earth?”
The argument should include the following:

- The scientific question
- Your claim (that is best supported by evidence and reasoning)
- The relevant evidence that supports your claim
- The scientific reasoning that links the evidence and science concepts to the claim

2b. Write a rebuttal stating why you did not argue for the other claim.

2a. My claim is that increases in human population do cause negative impacts on an ecosystem. My claim is based on evidence that the graybird population of East Island dropped from 20 years ago to 5 years ago, at the same time that the human population was increasing. Every five years, as the human population grew, the graybird population fell. Additional evidence is based on the beginning of an increase in the number of birds when hunting was changed from unlimited hunting licenses to limited licenses. My reasoning is that when the human population increases, there is likely to be more hunting (more predator-prey interactions) between humans and birds, so the drop in bird population is likely to be due to hunting. The recovery of the birds when hunting is limited confirms my reasoning that humans were having a negative impact on an ecosystem. The evidence is pretty strong that more people usually means more hunting, and hunting impacts the ecosystem.

2b. You can see in the table that when there are more hunting licenses, there are fewer Graybirds and Graybirds are an important link the food web. Increasing human population will probably be accompanied by increases in hunting.