Grade & Subject Area: **5th Grade Science**

Standard: 5.9 Organisms and environments. The student knows that there are relationships, systems, and cycles within environments. The student is expected to: (B) describe the flow of energy within a food web, including the roles of the Sun, producers, consumers, and decomposers;

Identify Essential Knowledge & Skills

Knowledge Students need to know…	**Skills** Students need to be able to…
• *Energy flows through ecosystems via feeding, or trophic, relationships* • *Decomposers get energy from dead and decaying organic matter (plants and animals) and return nutrients to the soil* • *Plants are producers and get their energy from the sun through the process of photosynthesis* • *Consumers get their energy by consuming other organisms* • *Organisms can fill more than one trophic role in an ecosystem (i.e. be a primary consumer and a secondary consumer)* • *90% of an organism's energy is lost via heat or used to power bodily functions; 10% of an organism's energy is passed to an organism that consumes it* • *Because energy flows through ecosystems based on trophic relationships, populations of organisms are interconnected and population change in one organism can affect population change in another organism*	• *Describe how food chains and webs show the flow of energy within an ecosystem through trophic relationships* • *Use arrows pointing in the correct direction to show energy flow* • *Read a food web or chain to understand trophic relationships between organisms* • *Recognize and give examples of each trophic role (producer, consumer, decomposer)* • *Draw a food web or chain to represent trophic relationships in an ecosystem* • *Predict how change in one population would impact another population*

ID the Gaps

High	Medium	Low
D – justifying food web shows how energy flows; interconnectedness of population shift	*B- correctly identified food web, didn't get population shifts* *C- incorrectly identified photosynthesis as best way to show energy flow; correctly answered 10 but did not provide strong justification* *E- answered correctly; did not provide strong justification*	*A- no justifications or annotation of question; unable to see misunderstanding*

Key Conceptual Gap (should be drawn from the knowledge & skills chart):

Because energy flows through ecosystems based on trophic relationships, populations of organisms are interconnected and population change in one organism can affect population change in another organism.

Mastery would increase the most if students could predict what would happen to other populations in a given food web based on what is happening with the populations of other organisms in that food web.

Key procedural gap (should be drawn from knowledge & skills chart):

Students are not annotating questions or justifying responses, making it difficult to ascertain their understanding.

Student mastery would increase if students justified their multiple choice responses on assessments.

Plan the re-teach

- **Select the type of reteach lesson: What type of reteach lesson best suits this misconception? Why?**

Modeling best suits this misconception, because there aren't strong student work samples to use for a show call, and students would benefit from seeing and working through multiple examples of one population shifting and predicting the impact on other populations

- **What are the key components that need to be included based on the student gap?**

I need to provide a food web with multiple trophic relationships represented, then model what would happen to different populations and why based on the relationship demonstrated by the food web.

- **What will I want to see when observing the teacher deliver instruction effectively?**

Setting a given context (i.e. tadpole population decreases) and extrapolating the impact on other populations, especially what tadpoles eat and what eats tadpoles, explaining WHY that impact is expected based on the tropic relationship to the original organism.

- **What student responses will tell me that the lesson has been effective?**

Students will be able to accurately predict the impact of one population's change on any other population within the same food web.

Script for modeling:

Using the food web from Q8 on the 2018 Released 5th grade STAAR

Establish that the food web tells us how organisms in the ecosystem interact. Establish that the direction of the arrows tells us which organisms are giving and receiving energy from which other organisms

Say: So I know that shrews get their energy from grasshoppers and crickets. And grasshoppers get their energy from marsh grasses. And because I know that, I can predict what would happen to shrews and to marsh grasses if the grasshopper population suddenly increased. Now there are MORE grasshoppers. With more grasshoppers trying to eat the marsh grasses, there would

probably be LESS marsh grasses. But since there are more grasshoppers to eat, the shrew population might increase.

Say: When making predictions about how changes in one species' population might affect another species, first you have to locate the first species on the food web, and determine the relationship it has to the species you want to know the impact it will have. Next, determine whether the impact will be an increase or a decrease based on their trophic relationship.

5.2 0 | 5.9B
5.3C Show how energy flows

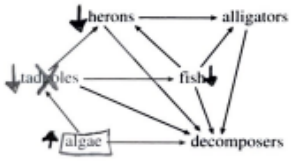
9 A student could best demonstrate knowledge of how energy flows throughout an ecosystem by—

(A) drawing a food web using specific organisms living in a pond — ecosystem
B conducting an experiment that demonstrates the process of photosynthesis — just plants
C labeling a diagram that illustrates ecological succession
D making a chart to show the role of bacteria in the environment — only bacteria

modeling for reteach think aloud
pinch card - make a model
- designing an experiment
- label
-

then exit ticket

10 The diagram below shows a food web.



Which population would probably increase if the tadpole population decreased?

F herons
G alligators
H fish
J algae

D

9 A student could best demonstrate knowledge of how energy flows throughout an ecosystem by—

A drawing a food web using specific organisms living in a pond

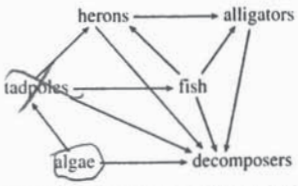
B conducting an experiment that demonstrates the process of photosynthesis

C labeling a diagram that illustrates ecological succession

D making a chart to show the role of bacteria in the environment

I chose A because a Food web shows how energy is in an ecosystem.

10 The diagram below shows a food web.



Which population would probably increase if the tadpole population decreased?

F herons

G alligators

H fish

J algae

I choose J because if the tadpole eats algae but if don't eat algae the algae is going to increase

5th Science 5.9B Student Work Samples

A

A

9 A student could best demonstrate knowledge of how energy flows throughout an ecosystem by—

A drawing a food web using specific organisms living in a pond

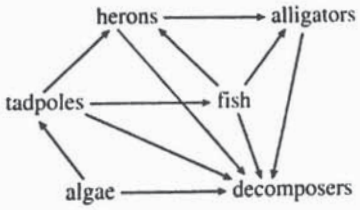
B conducting an experiment that demonstrates the process of photosynthesis

C labeling a diagram that illustrates ecological succession

D making a chart to show the role of bacteria in the environment

Photosynthesis uses energy

10 The diagram below shows a food web.



Which population would probably increase if the tadpole population decreased?

F herons

G alligators

H fish

J algae

B

9 A student could best demonstrate knowledge of how energy flows throughout an ecosystem by—

sun

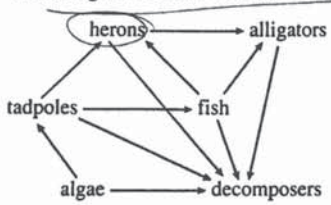
A drawing a food web using specific organisms living in a pond

B conducting an experiment that demonstrates the process of photosynthesis

C labeling a diagram that illustrates ecological succession

D making a chart to show the role of bacteria in the environment

10 The diagram below shows a food web.



Which population would probably increase if the tadpole population decreased?

F herons

G alligators

H fish

J algae

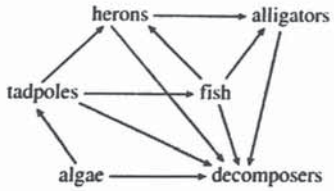
C J

9 A student could best demonstrate knowledge of how energy flows throughout an ecosystem by—

A drawing a food web using specific organisms living in a pond
B conducting an experiment that demonstrates the process of photosynthesis
C labeling a diagram that illustrates ecological succession
D making a chart to show the role of bacteria in the environment

I chose b b/c, they Proccess Photosynthesis to learn about it.

10 The diagram below shows a food web.



Which population would probably increase if the tadpole population decreased?

F herons
G alligators
H fish
J algae

I chose J b/c, the algae will increase.

E

9 A student could best demonstrate knowledge of how energy flows throughout an ecosystem by—

(A) drawing a food web using specific organisms living in a pond

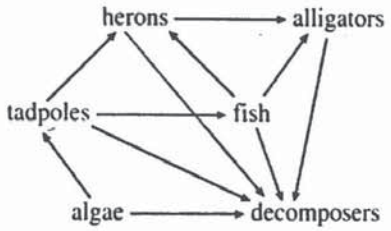
B conducting an experiment that demonstrates the process of photosynthesis

C labeling a diagram that illustrates ecological succession

D making a chart to show the role of bacteria in the environment

draw a food web using specific organisms that live in a Pond

10 The diagram below shows a food web.



Which population would probably increase if the tadpole population decreased?

F herons

G alligators

H fish

(J) algae

The Population of the algae will increase