

SI Biology - Full Discipline Demo

Food Web

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI Biology - Full Discipline Demo
Course	SI Biology - Full Discipline Demo
Instructor	Sales SI Demo

Test Your Knowledge

Match each term with the best description.

Population	A complex, graphic representation of all the feeding relationships within a community	1
Primary consumers	Organisms that obtain organic compounds by eating plants, algae, and other autotrophs	2
Producers	Organisms that use sunlight to create organic compounds	3
Food web	The study of the interrelations of organisms and their environment	4
Ecology	Group of individuals of the same species that inhabit a defined area at the same time	5

Correct answers:

- 1 Food web 2 Primary consumers 3 Producers 4 Ecology
5 Population

Categorize each statement as true or false.

⚡ The barn owl diet consists mostly of seeds and fruits.	
⚡ Barn owl pellets are regurgitated masses of undigested fur and bones.	
⚡ Biomagnification involves the efficient transfer of energy between trophic levels.	
⚡ Biomagnification results in the greatest accumulation of toxins in tertiary consumers.	
True	False
1	2

Correct answers:

1 Barn owl pellets are regurgitated masses of undigested fur and bones.

Biomagnification results in the greatest accumulation of toxins in tertiary consumers.

2 The barn owl diet consists mostly of seeds and fruits.

Biomagnification involves the efficient transfer of energy between trophic levels.

Exploration

An ecological community includes all organisms that live and interact within a defined area.

- ☒ True
- ☐ False



_____ are an example of a trophic level 1 producer.

- ☐ Carnivores
- ☐ Herbivores
- ☐ Detritivores
- ☒ Green plants



Biomagnification is the process in which toxic compounds decrease in concentration within organisms at each trophic level within an ecological community.

- ☐ True
- ☒ False



Barn owl pellets typically contain _____.

- ☐ fish scales
- ☐ eggshells
- ☒ small mammal remains
- ☐ fruits and leaves



Exercise 1

How many prey organisms were represented in your owl pellet? Reference Data Table 1 and Photo 1 in your explanation.

Student answers will vary but should match the bones dissected from the owl pellet and be supported by Data Table 1 and Photo 1. There were bones from 10 different organisms in the pellet dissected during internal testing.

Did the diet of the barn owl that produced the pellet for this exercise consist of primary consumers or secondary consumers? Reference Data Table 1 and Photo 1 in your explanation.

While students answers may vary, they should be supported by Data Table 1 and Photo 1. Historic analyses suggest that the owl pellets will predominantly contain rodent bones resulting in an answer that the owl's diet primarily consist of primary consumers.

Describe the food web represented by the items dissected from the owl pellet in this exercise making sure to include each trophic level.

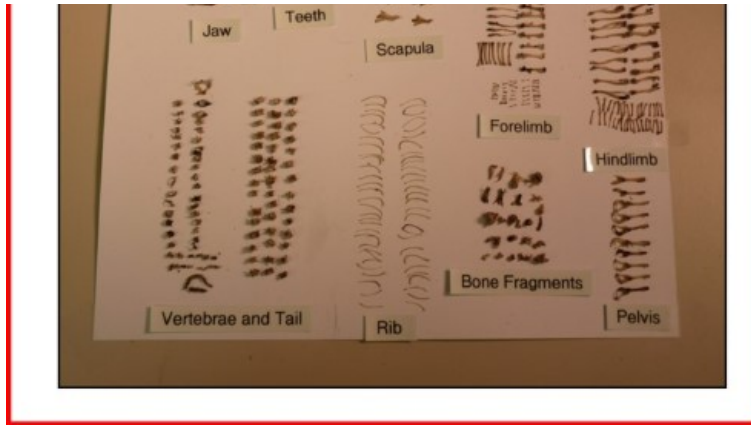
Students should describe a food web that includes green plants as the primary producers (trophic level 1), rodents as the primary consumers (trophic level 2), and barn owls as the secondary consumers (trophic level 3) if only rodent bones were found in the pellet. If shrew and/or moles bones were also represented, the student should also include insects and other invertebrates in trophic level 2 and list barn owls as tertiary consumers in trophic level 4.

Data Table 1: Record of Bones in Owl Pellet
(SAMPLE ANSWER BELOW)

	Mole	Rodent	Shrew	Total
Skull	Pellets will vary. Student answers should match Photo 1. From internal testing photo: 0	2	0	2
Lower jaw	0	3	0	3
Scapula				1
Pelvis				2

Photo 1: Bones of Dissected Owl Pellet
(SAMPLE ANSWER BELOW)





Exercise 2

How much was the concentration of DDT biomagnified between the primary producer and tertiary consumer in the salt marsh food web represented by the simulation? Reference Data Table 1 in your explanation.

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How does energy transfer between trophic levels of a food web differ from biomagnification?

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Data Table 2: DDT Concentrations per Trophic Level
(SAMPLE ANSWER BELOW)

	Trophic level	DDT concentration (ppm)
Water		0.00005
Plankton	Primary producer	0.05
Shrimp	Primary consumer	0.20
Sea trout	Secondary consumer	2.05
Osprey	Tertiary consumer	75

Competency Review

_____ is the study of the interrelations of organisms and their environment.

- ☐ Archaeology
- ☒ Ecology ✓
- ☐ Taxonomy
- ☐ Sociology

_____ feed on green plants, algae, and other autotrophs.

- ☐ Producers
- ☐ Detritivores
- ☒ Primary consumers ✓
- ☐ Secondary consumers

Within a food web, an apex predator may feed on both herbivores and carnivores.

- ☒ True ✓
- ☐ False

Biomagnification results in the most toxins being stored in the body tissues of ____.

- ☐ producers
- ☐ primary consumers
- ☐ secondary consumers
- ☒ tertiary consumers ✓

Barn owls regurgitate ____ containing the undigested hair and bones of small mammals.

- ☒ pellets ✓
- ☐ feces
- ☐ crop milk
- ☐ uric acid

The skulls and jaws dissected from owl pellets are used to identify the diet of the owl.

- ☒ True ✓
- ☐ False

A dissected barn owl pellet was found to contain both rodent and shrew remains, meaning the owl functions as a ____ in the community food web.

- ☐ producer
- ☐ primary consumer
- ☐ detritivore
- ☒ tertiary consumer ✓

____ are most likely to be negatively impacted by low levels of DDT in the water of a salt marsh community.

- ☒ Ospreys ✓
- ☐ Sea trout
- ☐ Shrimp
- ☐ Plankton

Extension Questions

Fruit-eating birds typically swallow seeds that are not digested and excreted in their feces. Apply your knowledge of food webs to explain how the seeds can be used to describe the bird's interactions with both lower and higher trophic levels in their communities food web. (SAMPLE ANSWER BELOW)

The feces of the trophic level 2 birds could be analyzed to determine the types of seeds they contained, which could be used to describe the trophic level one producers of the seeds. The presence of the same seeds in the feces of higher trophic level organisms in the food web could be used to infer that these predators consume the fruit-eating birds in their diets.