

# PHENOMENA, DRIVING QUESTIONS AND STORYLINE

## ECOLOGY

This unit explores the anchoring phenomenon: Introduced species are changing environments all around us. They can cause problems for people and affect biodiversity. Examples explored include Nile perch, zebra mussels, and local examples, such as starlings, kudzu, and others identified by students and teachers. Students generate and answer questions such as: How do introduced organisms interact with their environments, what are the effects of these interactions, and what can be done to prevent harmful interactions?

Phenomenon	Driving Questions	Guiding Questions	Activities	PE	Storyline/Flow (How an activity leads to subsequent activities)
People have introduced many kinds of species into new ecosystems either on purpose or accidentally, and they can cause problems for both people and the environment.	What are the effects of introduced species, and what can be done about them?	How have introduced Nile perch changed Lake Victoria? What are the trade-offs of introducing Nile perch into this environment? (Activity 1)  What effect can an introduced species have on an environment? What, if anything, can or should be done to control introduced species? (Activity 2)	1, 2 (15, 16)	MS-LS2-4 MS-LS2-5 MS-ETS1.A MS-ETS1.B	Does this happen elsewhere? (Find out in Activity 2)  Students research such a species, but in order to understand that research, they need to learn about Ecology. (Find out in Activity 3)
There are different organisms and different numbers of organisms in different places.	Why are certain species more common than others, and why do some species become more common over time?	What patterns do you detect in the two environments, and how might the information in these patterns be helpful to scientists? (Activity 3)  What patterns do you observe when you investigate your own environment, and what might be causing these patterns? (Activity 4)  How do the habitat requirements of individual organisms determine where a species will be found in nature? (Activity 5)  Do zebra mussel populations change or stay the same in their native range? (Activity 6)	3, 4, 5, 6	MS-LS2-1 MS-LS2-2 MS-LS2-4	How can we look for and detect patterns in the living environment? Transects are one method. (Find out in Activity 4)  These differences occur everywhere, including one's own backyard/school grounds, and we can use the transect method, too. (Find out in Activity 5)  Populations are found in places that have the right kind of features in the environment. (Find out in Activity 6)  Populations fluctuate in size, and determining the causes for those changes is an important question in ecology. (Find out in Activity 7)

# PHENOMENA, DRIVING QUESTIONS AND STORYLINE

## ECOLOGY (continued)

Phenomenon	Driving Questions	Guiding Questions	Activities	PE	Storyline/Flow (How an activity leads to subsequent activities)
<p>A variety of species tend to be found together and linked through feeding relationships.</p>	<p>How do different species in the same ecosystem interact with each other and with the physical environment?</p>	<p>What is an owl's place and role in a food web? (Activity 7)</p> <p>How do matter and energy move in an ecosystem? (Activity 8)</p> <p>How does the availability of food affect a population? (Activity 9)</p> <p>How do interactions with living or non-living factors in ecosystems affect populations? (Activity 10)</p> <p>How does a new species affect the flow of energy and movement of matter through an ecosystem? (Activity 11)</p> <p>What is the role of decomposers in the cycling of matter in an ecosystem? (Activity 12)</p>	<p>7, 8, 9, 10, 11, 12</p>	<p>MS-LS2-3 MS-LS2-1 MS-LS2-2</p>	<p>What an organism eats helps ecologists understand their role in an ecosystem. (Find out in Activity 8)</p> <p>We can look at what all the organisms in an ecosystem eat and connect them through energy and matter relationships. (Find out in Activity 9)</p> <p>When a population's prey increases in abundance, its size may grow; when its prey is scarce, its size may decrease. (Find out in Activity 10)</p> <p>There are patterns to the ways organisms interact in an ecosystem, and these patterns occur in all ecosystems. (Find out in Activity 11)</p> <p>Decomposers break down dead organisms and return the matter to the environment. (Find out in Activity 12)</p> <p>Ecologists can use models to try to predict the impact of an introduced species. (Find out in Activity 13)</p>

# PHENOMENA, DRIVING QUESTIONS AND STORYLINE

## ECOLOGY (continued)

Phenomenon	Driving Questions	Guiding Questions	Activities	PE	Storyline/Flow (How an activity leads to subsequent activities)
Physical and biological factors can disrupt an ecosystem to a small or large degree.	What happens to organisms and relationships among them when an ecosystem is disrupted?	<p>How can an abiotic disruption such as fire affect the flow of energy and cycling of matter in an ecosystem? (Activity 13)</p> <p>What do the scientific data tell you about how the Hudson River changed after introduction of the zebra mussel? (Activity 14)</p>	13, 14	MS-LS2-4	<p>Physical disruption can impact the flow of energy and cycling of matter in an ecosystem. (Find out in Activity 14)</p> <p>Ecologists have a large amount of data to examine the effects of Zebra Mussels; students will examine these same data. (Find out in Activity 15)</p>
People have introduced many kinds of species into new ecosystems either on purpose or accidentally, and they can cause problems for both people and the environment.	What are the effects of introduced species, and what can be done about them?	<p>How can an invasive species be controlled or eliminated? (Activity 15)</p> <p>What effect can certain introduced species have on an environment? What, if anything, can or should be done to control these species? (Activity 16)</p>	(1, 2) 15, 16	MS-LS2-5 MS-LS2-4 MS-ETS1.A MS-ETS1.B	<p>How can we look for and detect patterns in the living environment? Transects are one method. (Find out in Activity 16)</p> <p>These differences occur everywhere, including one's own backyard/school grounds, and we can use the transect method, too.</p>