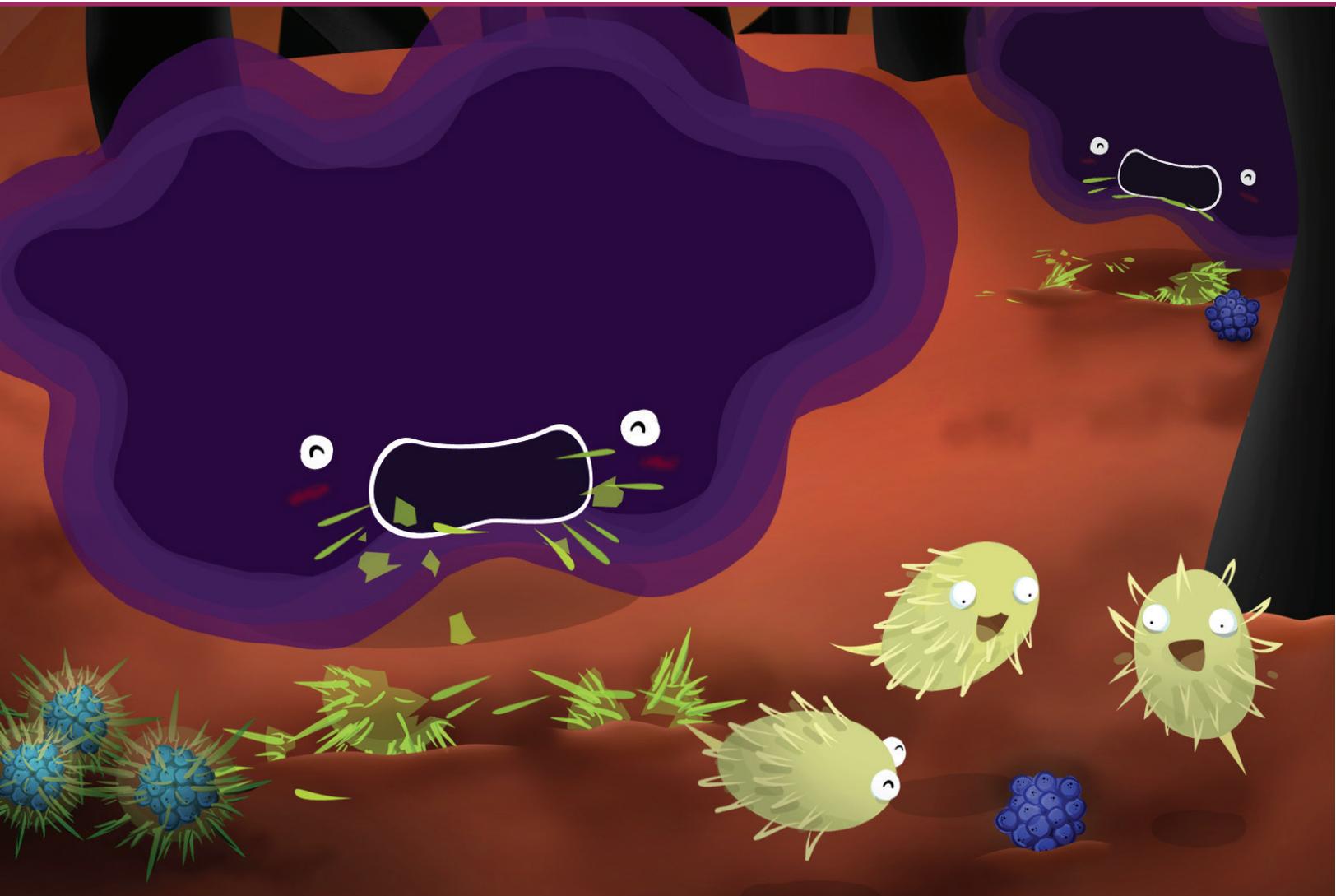


MAGICAL MICROBES

NGSS TEACHER'S GUIDE

Soil Ecology and Nutrient Cycling



NGSS Alignment

CORE IDEAS

Core Idea LS1: From Molecules to Organisms: Structures and Processes

LS1.A: Structure and Function

LS1.C: Organization for Matter and Energy Flow in Organisms

Core Idea LS2: Ecosystems: Interactions, Energy, and Dynamics

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

Core Idea PS3: Energy

PS3.B: Conservation of Energy and Energy Transfer

PS3.D: Energy in Chemical Processes and Everyday Life

Core Idea ETS1: Engineering Design

ETS1.A: Defining and Delimiting an Engineering Problem

ETS1.B: Developing Possible Solutions

ETS1.C: Optimizing the Design Solution

CROSS CUTTING CONCEPTS

- Patterns
- Cause and effect: Mechanism and explanation
- Scale, proportion, and quantity
- Systems and system models
- Energy and matter: Flows, cycles, and conservation
- Structure and function
- Stability and change

PRACTICES

- Asking questions (for science) and defining problems (for engineering)
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics, information and computer technology, and computational thinking
- Constructing explanations (for science) and designing solutions (for engineering)
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Vocabulary

Bacteria	Erosion	Parasitism
Biodiversity	Fungus	Parent Materials
Carnivore	Herbivore	Pores
Clay	Horizon	Producers
Climate	Humus	Silt
Commensalism	Inorganic Matter	Symbiosis
Components	Mutualism	Texture
Decomposition	Omnivore	Weathering
Ecosystem	Organic Matter	

Glossary

Bacteria	one-celled micro-organisms
Biodiversity	a measure of the number of different types of organisms living in an ecosystem
Carnivore	an organism that eats other animals
Clay	the smallest size of the soil particles
Climate	long term average of temperature and precipitation for a region
Commensalism	when one organism benefits from a relationship with another organism but the other is not affected (it does not benefit, nor is it harmed)
Components	an ingredient or one of many 'parts' that make up something
Decomposition	the process by which organic material is broken down into simpler compounds
Ecosystem	all the living and non-living things in an area
Erosion	the wearing down of soil by wind, water, heating and freezing
Fungus	a living organism which absorbs nutrients by decomposing its food source

Herbivore	an organisms that eats plants
Horizon	another name for the layers in soil
Humus	the dark organic material in soil formed from the decomposition of once living plats and animals
Inorganic Matter	materials that are not and never were alive
Mutualism	where each organism benefits from the relationship
Omnivore	an organism that eats both plants and animals
Organic Matter	things that are living or were once living (leaves are 'dead' but were once alive)
Parasitism	where one organism lives off of another organisms – typically one organism benefits while the other one is harmed.
Parent Rock Materials	in soil, parent materials are the types of rocks and minerals that eventually become soil over time
Pores	small openings or spaces between particles
Producers	organisms that make their own food from inorganic raw materials
Sand	the largest size of the soil particles
Silt	a type of soil particle between the smallest (clay) and the largest (sand)
Symbiosis	where two organism interact, typically in a way that is beneficial to both
Texture	the varying structure of something, such as rough or smooth
Weathering	the process by which rocks are broken down

