



PLANTS

HANDBOOK





PLANTS highlights the wild, diverse relationships among plants, animals, and place around the globe. This guide offers facts, interaction tips, and plenty of prompts for conversation as you and your child wander earth's biomes:



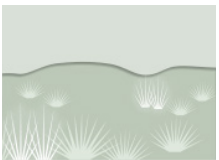
TEMPERATE BROADLEAF AND MIXED FOREST

Deciduous trees and conifers tower over flowers and burrowing animals. Foliage peaks and wanes in four seasons.



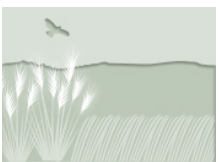
DESERT

Succulents and deep-rooting palm trees seek and keep water in the hot heat. Rare rain brings a burst of neon blooms across the sandy landscape.



TUNDRA

Tiny lichen and willows persist atop the frozen permafrost. Plants stay dormant in the long, windy, pitch-black winters—springing to life come brief summer.



TEMPERATE GRASSLANDS

Grasses flourish in nutrient-rich soil and withstand drought, grazing herds, and sweeping wildfires.

Like all apps in the *Explorer's Library*, **PLANTS** rewards curiosity, with no rules or levels. Dive in: each biome brims with life, and hidden surprises arise with every new adventure.

Biomes

A biome is a living system that encompasses the plants, animals, climate (temperature and rainfall), and general features (landscape, soil type) of a geographic area. Each biome has a special mix of characteristics that determine which plants (and animals!) survive and thrive. Scientists name some biomes after the region's dominant plants. For example: the grasslands feature myriad grasses, and the mangroves consist of mangrove trees.

Plants respond to a huge number of factors: neighboring plants, insects and other animals, phenomena like winds, droughts, and fires, and outside visitors like, well, us. They've adapted to sprout, bloom, and grow in varied water, sun, temperature, and soil conditions. From these intricate relationships spring rich, biodiverse communities throughout the world.

INTERACTIONS TO TRY IN EVERY BIOME

Within each biome, try the interactions below to discover how flora and fauna react. Thanks to algorithmic animations, each combination yields new secrets: discover weather patterns that range across biomes, changing seasons, underground mini-universes, and plant processes like growth and reproduction. Discussion questions offer starting points for conversations with your kids.



Spin through seasons with the time dial.

Turn day into night, weeks into months, and months into years. As time marches (or hurtles!) on, see how the seasons, sunlight, and weather patterns influence plant growth and animal life.

How do plants change throughout the year? Which plants stay the same?

How many seasons can you spot?

Do all biomes have the same seasons?

Why do some plants flower at night?



Double-tap clouds to make rain. Drag and rub clouds together for lightning. Swipe the screen to whoosh wind.

Weather patterns over time determine a biome's climate.

Discover which clouds hold rain and double-tap to make it pour. See how rainfall shapes the types of plants within an area.

Drag and rub rain clouds together to make thunder and lightning. But watch out! When lightning strikes a tree or grasses, it can spark wildfires.

Swipe side-to-side across the screen to generate a breeze or gale. Strong roots help anchor plants during fearsome winds. But the wind also helps plants reproduce: it disperses pollen in the forest and seeds in the grasslands.

How much rain falls in different biomes?

Can rain evaporate before it hits the ground?

How do plants (and animals) respond to rain?

What happens when lightning strikes a tree? Or grasses?

What does the wind sound like in different places?

How does wind affect plants?



Move the slider to spy life below ground: soil, roots, and burrows.

SOIL

Dirt consists of rocky bits and minerals (including nitrogen, potassium, and phosphorus, among others), organic matter (fungi, lichen, and dead leaves), water, and air.

Each biome has its own type of soil: dark silt, gritty sand, or clay. Different soils allow different levels of water and nutrients to seep through. Silt is the most fertile, while tacky clay has the poorest level of nutrients. Sandy soil isn't as nutrient-dense as silt, but its good water drainage suits desert plants.

The kind of soil, how fast or deep water can seep, parent materials, climate, and land all influence plant growth. Both the forest and grasslands boast fertile topsoil layers, whereas the tundra has a thin slice above the permafrost.

Investigate each biome's soil layers:

Topsoil, the top layer that tends to have the most nutrients and plant and animal activity, from roots to worms. Fungi and bacteria recycle nutrients to the earth.

Subsoil, the layer underneath with scattered rocks throughout—plants might extend their roots here in search of more water.

Parent materials, the rocky layer below the subsoil that gives the soil minerals.

How do soil layers differ across biomes?

What do fungi and bacteria break down in the forest to make its topsoil chock-full of nutrients?

How do the cold temperatures affect the tundra's soil?



ROOTS

Roots have two important functions: they keep a plant in place and absorb minerals, nutrients, and water from the soil. The more roots, the more nutrients the plant can both absorb and store for the winter.

Discover different root systems. Some are shallow and horizontal, terrific for collecting rainwater. Others are wide and deep, which help store more water. Some trees, like young forest oaks, have one central root, called a taproot, which extends deep into the dirt to reach groundwater. Other plants, like desert palms, develop complex, sprawling networks to soak up water and nutrients.

What kinds of root systems do you see?

Which roots have the biggest plants? The smallest?

Which roots go the furthest underground?



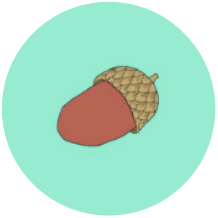
BURROWS

Spot burrowing animals, who head underground as the seasons and temperature change. Burrows can be places to warm up or cool down, store food, rest, and escape from hungry predators. Resourceful creatures line their dens with leaves, grasses, and twigs.

Which animals burrow underground?

What plants do you see in their homes?

What time of day and what time of year do animals burrow?



Drag and plant seeds to observe plant life cycles.

Plant a seed and watch a seedling sprout, given the right combination of water, temperature, and oxygen. Otherwise, it stays dormant.

What does a seedling need to grow?

When are seedlings most likely to grow?



Drag an animal near a plant and observe its behavior.

Plants and animals rely on each other. Animals breathe oxygen produced by plants and eat plants' roots, stems, leaves, and fruits to get sugars, nutrients, and water. Animals also use plants for shelter, whether it's a nest within a tree or a leaf-lined burrow.

Plants, in turn, depend on animals (along with wind and water) to dispatch pollen as part of reproduction. Bright petals and sweet scents draw in birds and insects. When bees feast on pollen and guzzle nectar, sticky pollen bits latch onto their bodies and are delivered to the next plant they visit.

Animals help to disperse seeds, too. Squirrels bury acorns, while some animals snack on fruits and then drop seeds back through their poop.

What plants do animals eat? Are there plants they won't eat?

Can you spot any animals sleeping or living in plants?

How do animals help pollinate plants? What do those plants look like?

How do animals help spread seeds? What part of the plant has seeds?

PLANTS UP CLOSE

Explore plants in detail. Water a seed, sprinkle pollen across flowers, and plant an acorn. A brief introduction to basic plant processes below helps support your kids' learning.



Tap the magnifying glass. Tap within any circle to take a closer look at plant processes.

PLANT PARTS

Most plants share three key parts: roots, stems, and leaves. Some plants also bear flowers or cones, which function in reproduction. All plant parts are made of cells. Their cell walls are made of cellulose, a sugar-based compound that provides structure to the plant and is sturdy enough to make up the cotton fibers of our clothes or the paper of our schoolbooks.

Together, the parts work to keep plants healthy. Roots and stems hold plants upright and gather, store, and parcel out water and nutrients. Leaves make plants food through photosynthesis.

PHOTOSYNTHESIS

Plants are tiny factories that convert sunlight, water, and carbon dioxide into plant food (sugars) and oxygen. This process is called photosynthesis. Oval-shaped chloroplasts in a plant's leaves contain the green pigment chlorophyll, which soaks up energy from the sun. Tiny pores on the leaves called stomata breathe in carbon dioxide from the air, while the stem ferries water from the roots.

Plants convert these ingredients into simple sugars that help build new plant cells and keep a plant strong. As a vital bonus, opened stomata pores release oxygen as a byproduct — colossal algae colonies produce at least half of the world's oxygen. Since animals (including humans!) need oxygen to survive, plants are crucial for life.



GROWTH

Wrapped in dry, protective seed coats, plant embryos "wake," given the right water, oxygen, and temperature levels. This process is called germination. Roots and shoots crack through the coat first, and—sound the trumpets: a seedling is born. Some plants, like mosses and ferns, reproduce from single-celled spores.

Healthy growth depends on a host of factors: the amount of available water, light, and soil minerals; levels of oxygen and carbon dioxide (CO₂ fuels photosynthesis); and weather conditions and temperature.



REPRODUCTION

Plants are divided into two reproductive groups: those that reproduce via spores, like mosses and ferns, and those that reproduce via seeds, encased in either cones (like some evergreens) or fruits. Many plants, like the tundra's arctic willow, can also reproduce asexually.

For most seed plants, reproduction has two key steps: pollination, in which pollen from a plant's male parts reaches the female parts, and seed dispersal. Pollination can take place within the same plant or between two separate plants.



Temperate broadleaf and mixed forest

BASED ON THE UNITED STATES NORTHEASTERN FOREST

The dark woods loom in our imaginations, full of storybook beasts and ghouls. But the forest's magic is quiet as it cycles through life, death, and rebirth. Deciduous trees lose their leaves and slumber through winter, while coniferous evergreens keep their needles sharp year-round. Come spring, the forest resounds with buzzes, chirps, and squeaks as animals (including insects!) welcome new blooms.

The forest grows around the globe in places with four distinct seasons, from freezing winters to warm summers. Plenty of sun and rain (and snow), in tandem with nutrient-rich soil, help plants flourish.

What does the forest look like? What are its major layers?

The forest has several layers, loosely defined by the type and height of the plants present. At the top, a canopy of adult trees (maples, oaks, hickories, and elms) tower 60 to 100 feet. Beneath lies a shorter layer of young trees and shrubs, followed by an understory of wildflowers, herbs, and grasses along the forest floor.

The canopy's leaves shade the plants below and keep rivers and streams cool. During storms and high winds, the treetops shield plants and animals in the understory, the forest's most biodiverse layer.

On the forest floor, fungi, like the tawny milkcap mushroom, and bacteria decompose fallen leaves, bark, and fruit to get energy. In the process, they load the topsoil chock-full of nutrients, ripe for healthy plant growth.



Spin the time dial. How many seasons do you count? How do the plants and animals react?

The temperate forest has four seasons.

Spring is a bounty of technicolor blooms—and pollen, to bees' delight. On the forest floor, small, quick-growing plants (mostly flowers) called ephemerals bathe in the sun. Above, the canopy continues to fill. Birds, like woodpeckers and warblers, flock to new green leaves, and animals stretch their bodies after winter sleeps.

In the summer, a full canopy of broadleaves soaks in the sun's rays for photosynthesis and shades the lower layers. Although the ephemerals have wilted down to dormant roots, trees fruit, and the forest teems with life.

Come fall, cooler temperatures and the shortening day cause leaves to transform into bright crowns of red, orange, and yellow and fall to ground. Fungi and bacteria break down the fallen leaves and bark, returning nutrients to the earth. Plants store energy in their roots, prepping for spring's regrowth; birds head south to warmer climes; and animals stock up on nuts from oak and hazel trees.

During winter, the ground freezes. Tree branches are bare, and many animals are asleep or burrowed under the snow. The forest is quiet, waiting.



Take a closer look: tap the great rhododendron. How does it respond to cold winters?

An evergreen shrub, the great rhododendron curls its leaves to protect them from the cold. The icier the temperature, the tighter the curl.

Tap the cloud to make snow, and see the rhododendron's deep green leaves curl shut. Tap the sun to melt the snow. As the temperature warms up, see the leaves unfurl and large, white flowers bloom.

What kinds of trees live in the forest?

Two key types: broadleaf, deciduous trees and evergreen conifers.

Broadleaf trees have wide and thin leaves, useful for absorbing spring and summer sunlight. They lose their leaves in autumn.

Evergreens keep their leaves year-round. Conifers, a type of evergreen, have special adaptations that help them survive the cold. Conifers have narrow needles that need less water and come with a wax coat that hinders water loss and protects from wind. The more needles, the more an evergreen can take advantage of the fleeting sun for photosynthesis during winter.

Why do deciduous trees shed their leaves?

The broadleaves prove too thin and fragile to withstand the freezing winter. As chlorophyll (the pigment within plants that soaks in sun and makes leaves green) levels drop and the day shortens, trees lose their leaves and seal the joints where leaves meet branches. This conserves the trees' energy, until their leaves regrow come spring.

Swipe across the screen to whoosh wind. How does the wind help the forest?

In the temperate forest, wind pollinates most trees, sweeping pollen from the trees' male parts to the female parts. Once a tree is pollinated, it bears seeds, encased in nuts (like the oak's acorns) or cones.



Take a closer look: tap the white oak tree. How does wind help the oak tree?

Wind pollinates the white oak. The oak has both male and female flowers, which bud in the spring.

Tap the oak to see the branches up close.

Swipe to gust wind across the dangling, yellow male flowers (pollen-laden clusters called catkins). The wind sprinkles pollen over the female flowers; the more wind, the more pollen is dispersed. Once pollinated, the flowers develop into acorns.

Swipe again or tap to knock a mature, brown acorn off the branch. Drag the acorn to plant it in the ground. From this seed, a new oak sprouts: the first step toward mighty future oaks.



Drag and rub two clouds together to create lightning. Generate lots of lightning to spark a wildfire. How do wildfires affect the forest?

Unlike in the grasslands, wildfires in the forest are mostly destructive: flames that spread from the canopy knock out centuries' worth of growth, scorching the soil and depleting nutrients.

After a fire, a forest takes anywhere from 40 to 100 years to slowly regrow into its full-fledged self.

Luckily, natural fires are rare in the temperate forest. They happen once every 100 to 200 years.

Move the slider across the screen. What do you spy?

Topsoil in the forest is a vitamin goldmine, thanks to the mushrooms, bacteria, and earthworms that decompose dead leaves and woody matter into nutrient-rich soil. The dark-brown dirt is porous, so water seeps further down into the subsoil. Well-watered soil layers keep plants hydrated and healthy.

Plant roots are wide and fibrous or clumped close to the surface, readily absorbing minerals and water.



Take a closer look: tap the tawny milkcap mushroom. Are mushrooms plants? How are they important to the forest?

Here's a secret: the tawny milkcap mushroom isn't a plant, but a member of the fungi kingdom. Fungi break down fallen leaves and other organic matter to get energy and return nutrients to the soil.

Below ground, the mushroom's ghostly mycelia (a root-like network of fine, white filaments) release enzymes that decompose leaves and branches.

Tap a leaf to see the mycelia digest it, leaving behind fertile dirt.



Take a closer look: tap the bloodroot. What helps pollinate the bloodroot?

The bloodroot's large, white blooms and yellow stamens attract bees, which pollinate the plant.

Drag the bee to a flower. Pollen produced at the top of the stamen sticks to the bee. When the bee visits another flower, pollen grains dust the flower's female parts, called the pistil.

Once pollinated, the bloodroot's blooms close into seedpods. Tap a seedpod to reveal dozens of round seeds.

See the bloodroot's thick, gnarled root, whose juice is red and toxic. Its root supports multiple flowers and stocks energy for the next spring, letting the bloodroot bloom early before the forest's canopy shades the forest floor.



Desert

BASED ON THE ARABIAN DESERT

The desert is brutal: high heat, winds, and acres of sand dunes as far as the eye can scan. Stubby shrubs dominate. Precipitation is scant, less than 10 inches per year. Some deserts are so hot that rain evaporates before a drop hits the ground. Yet each plant and animal is perfectly suited to the parching heat. The plethora of life that thrives in these grim conditions is a real wonder.

The desert, on closer inspection, brims with activity: you need only to know where—and when—to look.

As daytime heat sinks into cold evenings, bees pollinate plants like the skipped aloe, as teeny rodents gnaw meals of seeds, roots, and leaves near the oasis. After a rain, desert ephemerals burst across the landscape with neon blooms.



What does the desert look like? What are its major features?

The landscape consists of sand dunes, graveled shrublands, the oasis, and the occasional rocky outcrop.

Wind-blown sands slooowly shift across the landscape. The dunes are sterile giants, whose heights reach up to 800 feet. Because the sand dunes are devoid of water and nutrients, no plants can grow.

A mix of sand, gravel, and gypsum (a white mineral) covers the bulk of the terrain. This area features mostly shrubs, like the caper plant, alongside alfalfa and succulents.

The oasis, built atop a supply of groundwater, supports larger trees like the sycamore fig, Yemen dragon tree, and date palm. Rare bouts of rain also help sustain the oasis. More water translates into more plants. Some animals traverse vast distances to drink from the oasis and feed on neighboring plants, including dates. Many animals, including the sand gazelle, rely on plant parts as their main source of water.

Bedrock outcrops jut at the desert's outskirts, offering shade to plants and animals.

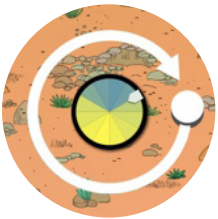


Take a closer look: tap the date palm. Why do date palms need sunlight?

The date palm thrives near the oasis. Dates ripen on the stem under the hot sun.

Tap the sun to beam rays toward the palm. Swipe wind across the palm to knock ripe, brown dates off their stems.

Drag a date to plant it in the oasis's silty soil. The tiny seed within a date sprouts into a new palm.



Spin the time dial. When is the desert most active?

At night, when temperatures cool. Flowers open, and nocturnal animals emerge from their burrows to snack on grass and bugs. Some animals, like the sand gazelle, roam till early morning.

In the daytime, temperatures hover between 70°F and a sweltering 110°F (roughly 21°C and 38°C). Plants keep their flowers closed, and some animals (like the tiny, jumping jerboa) escape the sun to snooze underground or in the shade. Cold-blooded lizards, however, sunbathe to warm their bodies, before skittering in search of fresh fare: birds and eggs.

Double-tap the clouds. What happens in the desert when it rains?

Once it rains, rabbit-quick ephemerals grow, bloom, produce new seeds, and go dormant or perish, all within two to three weeks. Seeds can stay dormant (sometimes for years) until they absorb enough rain for the plant to sprout.

Rainwater forms temporary pools. Toads plop their eggs in the water, whose surface is dotted with algae—prime nutrients for thousands of tadpoles.



Take a closer look: tap the alfalfa. When do alfalfa seeds germinate?

While succulents survive dry seasons by storing water, other plants, like the alfalfa, stay dormant until it rains.

Tap the cloud to make rain. Once the seed has enough water, a tiny sprout and root crack the seed coat open. Tap the cloud to make more rain: the alfalfa seedling grows and grows, until bright purple flowers bud and bloom.

How have plants adapted to the desert? What special characteristics have they developed?

As water is scarce, plants have evolved to nab and store whatever water they find. Most plants develop thick roots or sprawling root networks to absorb more water. Trees and shrubs, like the sycamore fig, feature deep taproots that dig for groundwater by the oasis, while succulents have shallow, wide roots to better collect rainwater from the sandy topsoil.

Succulents are powerhouse storerooms for water: fleshy stems, leaves, and fruit supplement the roots' water intake. Leaves tend to be small and either glossy (to reduce heat) or waxy (to reduce water loss, as on the aloe).

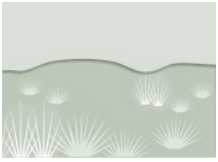
To help ward off thirsty animals, both the caper and aloe plants' leaves have spines. Unfortunately, a camel's thick mouth trumps any caper spike. The desert rose, however, stays safe: all parts of this shrub are toxic.



Take a closer look: tap the skipped aloe. How does it store and protect its water supply?

Skipped aloe keeps water in its pulpy, waxy leaves, whose spiky edges protect against herbivores.

Swipe across the aloe to peek inside a split leaf. Tap the leaf to squeeze out its clear, gel sap.



Tundra

BASED ON THE SIBERIAN TUNDRA

The windy, treeless tundra is a land of extremes, akin to the desert's harsh realms. The tundra is the northernmost, coldest biome and one of the driest. Temperatures regularly plunge below freezing, but less than a foot of snow accumulates per year.

Tiny plants cling and persist in total darkness across the vast plains. Sharp-nosed caribou sniff out root-less lichen even beneath the snow, plucking bits of alga and fungus for supper.

Spin the time dial. How many seasons do you count?

The tundra has two main seasons: long, freezing winters and fleeting summers.

How do plants and animals survive the tundra's piercing winters?

Most plants, except the evergreen bearberry, stay dormant to survive the eerie and pitch-black winters that last and last. Roots store plenty of energy, so plants can spring to action during the sun of summer.

Birds and some mammals migrate to warmer climes. Others, like lemmings, snooze off-and-on under snowy burrows. Polar bears, bundled in thick coats and body fat to keep warm, prowl the tundra year-round for seals and other prey—garnished by berries, roots, and sea kelp.

What do plants and animals do during the tundra's brief summers?

Plants hustle to grow, flower, and seed in a few kaleidoscopic months, fueled by sunshine 24 hours a day. Like the desert's ephemerals, the pasqueflower is a fast study: its blooms, violet with bright yellow stamens, last only two weeks.

Summer temperatures max at a still-cool 50°F (10°C). The all-day sun melts the ground's active topsoil layer, providing water to thirsty roots. The water also pools atop the permafrost, hosting swarms of mosquitoes, flies, and pollinating bees, among others. Returning birds, like arctic loons, feast on aquatic insects and lay eggs. Some animals, like lemmings, swap their white winter coats for summer browns to blend with the new landscape.

Swipe across the screen to whoosh wind. How does the wind affect the tundra?

Because of the short growing period and fewer animals, plants depend on wind to disperse their seeds (cottongrass) or spores (arctic moss, lichen).

The intense winds and chill also shape how plants grow—or don't. To shield themselves, plants cluster and crouch low to the ground. The arctic willow shrub, whose height varies from less than an inch to about a foot, also flexes strong, stout roots to keep upright.

Move the slider across the screen. What do you spy? How does the soil affect plant life?

The tundra has a thin, active topsoil layer, which offers some nutrients during the summer thaw.

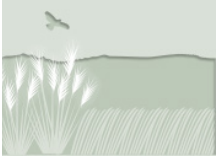
Below ground lies the world's worst ice pop (complete with gravel chunks), a permanently frozen layer called the permafrost—which stretches as deep as 1,500 feet. The permafrost is an impervious fortress that neither water nor roots can breach.

Without deep, rich soil, plants tend to stay small, with shallow roots that drink in surface water. The upside? Their small size means they expend less energy.

How have plants adapted to the tundra? Any special characteristics?

In response to the cold, dark conditions, tundra plants have simpler structures. Leaves are tiny and waxy, which helps to retain moisture, and stems often have downy hairs to trap warmth. Some plants, like the pasqueflower, also produce sap with low freezing points, which prevents plants from icing over in the winter.

The arctic willow and lichen reproduce vegetatively, sprouting new growth from busted (or gnawed-on) branches and clumps. This ability to self-regenerate keeps plants from solely relying on the wind or other pollinators.



Temperate grasslands

BASED ON THE SOUTH AMERICAN PAMPAS

Seasonal droughts, grazing herds, and low, sweeping wildfires shape the grasslands. Two seasons reign over the grasslands: hot, wet summers and cold, dry winters (with the occasional frost). Late summer storms bring rain and lightning strikes.

Bunch and pampas grass abound, alongside low shrubs and flowers. Plants benefit from rich soil, full of nutrients from decaying grass roots; termites and ants also recycle plant matter back into the dark dirt. Long-legged fauna lope through the tall grasses as smaller creatures burrow.

How do phenomena like drought and fires maintain the grasslands? What about animals?

Drought, fires, and animals all contribute to the region's upkeep.

Drought and wildfires prevent large trees and shrubs from reaching adulthood. Spurred by wind, low-burning fires sprint across the grasslands. The fire's quick pace and low temperature also decompose dead plants (resulting in more soil nutrients), as fire-adaptive grasses grow and regrow. Grazing animals, like llama-like guanacos, give the grasslands a daily trim.

How do plants withstand wildfires, drought, and enthusiastic grazers?

Grasses have special growth buds near or just under the surface of the soil, which allows for continued growth even after a fire or hungry guanaco. Extensive root systems help absorb water and nutrients from the fertile soil.

The ombu, the grasslands' lone tree, is triply prepared. Its spongy trunk (so soft you can slice it with a knife!) bulges with water, akin to desert succulents. Its plentiful water keeps the ombu alive during drought or fire, while its poisonous sap dissuades would-be grazers.

What's the difference between a tree and a shrub?

From a scientist's point of view: there isn't one.

In everyday use, however, trees have one woody stem (or trunk), while shrubs have multiple stems.

Some trees, including the mesquite or ombu, even start as low shrubs. In the grasslands, though, fires ensure that young shrubs—except the ombu—never mature into lofty trees.

Move the slider across the screen. Why is grasslands soil so loaded with nutrients and minerals?

A wealth of decomposing roots, insect helpers, fungi, and nitrogen-fixing legumes all contribute to the grasslands' deep, deep topsoil.

Industrious ants and termites, along with fungi, break down dead roots and plant matter, returning nutrients to the earth. Legumes (plants with seedpods) have tiny bacterial barnacles in their roots that chemically transform atmospheric nitrogen into a form (called "fixed" nitrogen) plants use to stay healthy. When a legume dies, the released nitrogen enriches the soil.

Beyond food, how do the grasses benefit animals?

Tall grasses give cover to small mammals. After a fire, animals like the viscacha and other rodents are more exposed—putting them right in the sights of predators like the maned wolf.

The greater rhea, a flightless ostrich-kin, also hides its eggs within grassy nests.

FURTHER READING

Rooting for more on biomes and plant life? Start with these resources.

ARKIVE

<http://www.arkive.org>

NATIONAL GEOGRAPHIC EDUCATION

<http://education.nationalgeographic.com/education/>

SCITABLE: THE NATURE EDUCATION KNOWLEDGE PROJECT

<http://www.nature.com/scitable/knowledge/library/terrestrial-biomes-13236757>

WEATHERSPARK

<http://weatherspark.com>

WORLD WILDLIFE FUND

<http://worldwildlife.org/biomes>

THANKS

Every Tinybop app is developed with the goal to inspire, delight, and inform. We champion thorough research, and we work with experts to make sure we get scientific concepts right. Many thanks to our reviewers for their time, care, and invaluable help with **PLANTS**.

Sean M. Beckmann, PhD, Assistant Professor of Biology, Rockford University

Hannah Buckley, PhD, Ecologist, Lincoln University, New Zealand

Cameron Douglass, PhD

Jennifer Marie Jacobs

Stephen R. Johnson, PhD, Ecologist and Botanist

Emily Lescak, PhD Candidate, University of Alaska Fairbanks

Karin Neff, PhD, Montana State University

Michal Shuldman, PhD

Mary Stark, PhD, Professor, Central College, Iowa

Stephanie A. Stuart, PhD, NSF Fellow, Ulm University, Germany