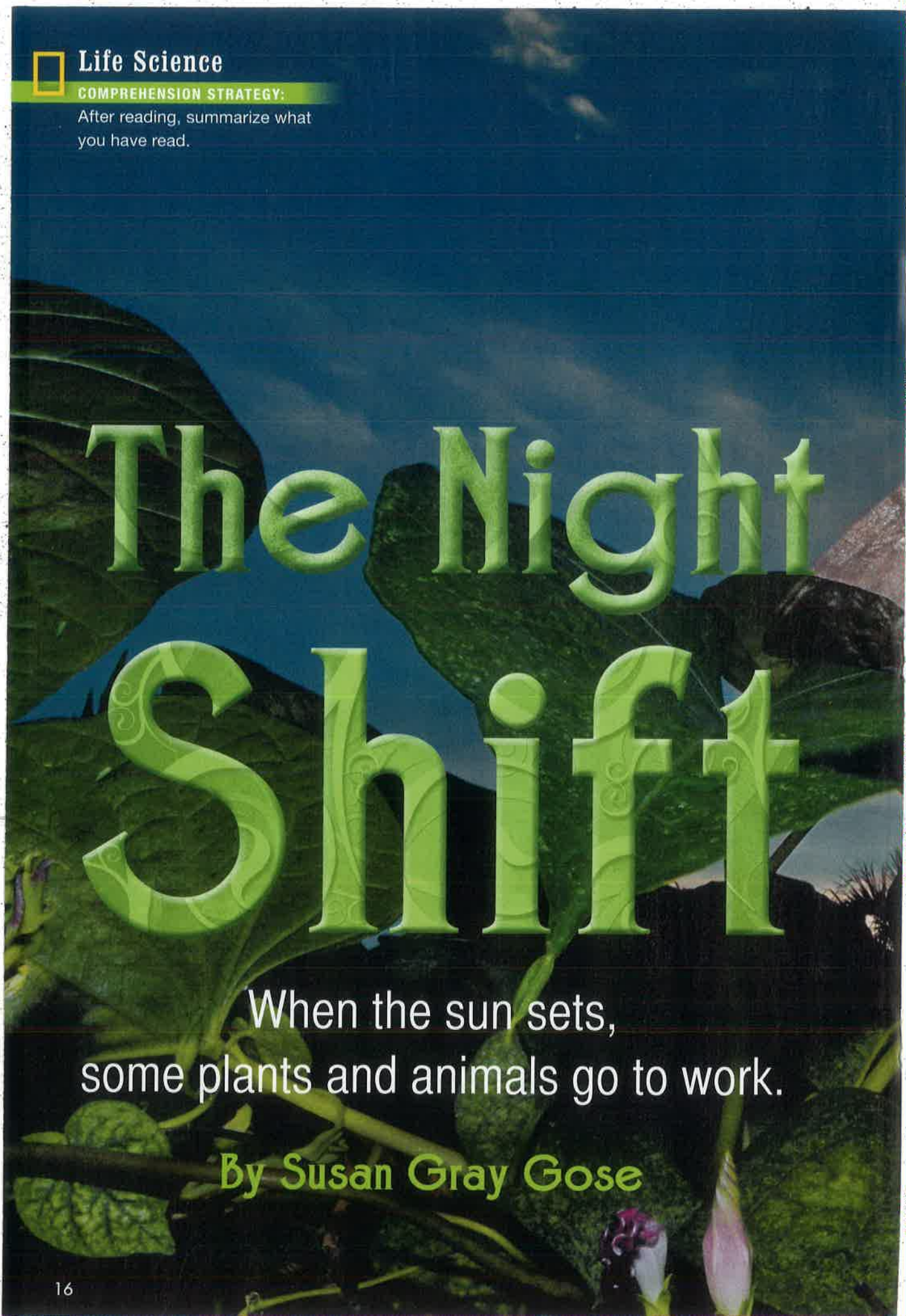


Life Science

COMPREHENSION STRATEGY:
After reading, summarize what you have read.

The Night Shift

When the sun sets, some plants and animals go to work.

By Susan Gray Gose

In the moonlight, dark and scary shadows dance around a tree. They look like long, skinny fingers. As the wind blows, a sound like rattling bones rises. Clickety-clack, clickety-clack.

Suddenly, a stink fills the air. High up in the tree, flower buds open. They smell like rotting fruit. It is a sign that the Midnight Horror tree is blooming.

You'd think these sights, sounds, and smells would scare everything away. Think again. This creepy tree is inviting visitors.

Attracted by the smell, a bat zooms to the tree. It buries its head deep in a flower. Smelly nectar fills the bottom of the flower. The bat quickly laps up this juice. It must hurry. By morning, the tree's flowers will shrivel up and fall off.

As the bat drinks, a powder falls onto it. The powder is the flower's **pollen.**

When the bat flies to another flower, it takes the pollen with it. Some of the pollen falls off into the next flower. Now the tree can make seeds. Someday, these seeds may grow into new Midnight Horror trees.

Day and Night

Like the Midnight Horror tree, many plants need help spreading their pollen. Unlike the tree, most of these plants have flowers that bloom during the day.

These daytime flowers have special ways to attract visitors. They use bright colors, pretty patterns, and sweet smells. Bees, butterflies, and other daytime **pollinators** buzz by.

These plants and animals mostly stay busy while the sun is up. Then night falls, and the night shift begins.

A different group of plants blooms. Some flowers have names like evening primrose or four-o'clocks. They open just as the sun sets. Other flowers, like those on the Midnight Horror tree, only open in the dead of night.

At night, a new crew of pollinators takes over. They include bats, moths, and other nocturnal animals.

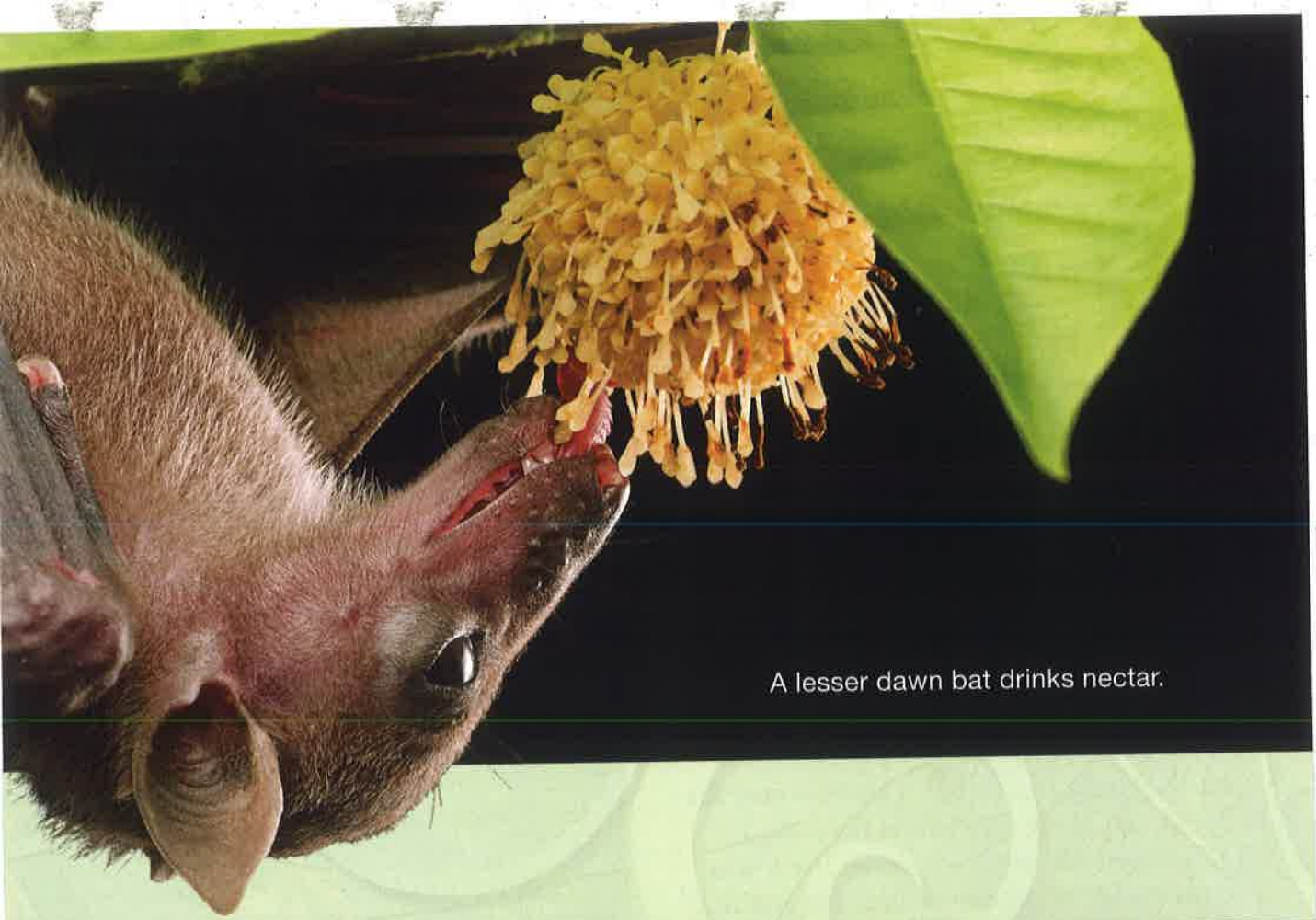
Moon Glow

Night flowers can't use the same ways as other flowers to attract pollinators. For instance, bright colors and pretty patterns don't show up in the dark. So most night flowers are white or a pale color.

A moonflower is a good example. As the sun sets, it opens its petals. It's so bright white that it seems to glow in the dark. A hawk moth quickly spots it and swoops in. Instead of a mouth, the moth has a long proboscis. The moth pokes it deep into the flower. It uses it like a straw to slurp up nectar.

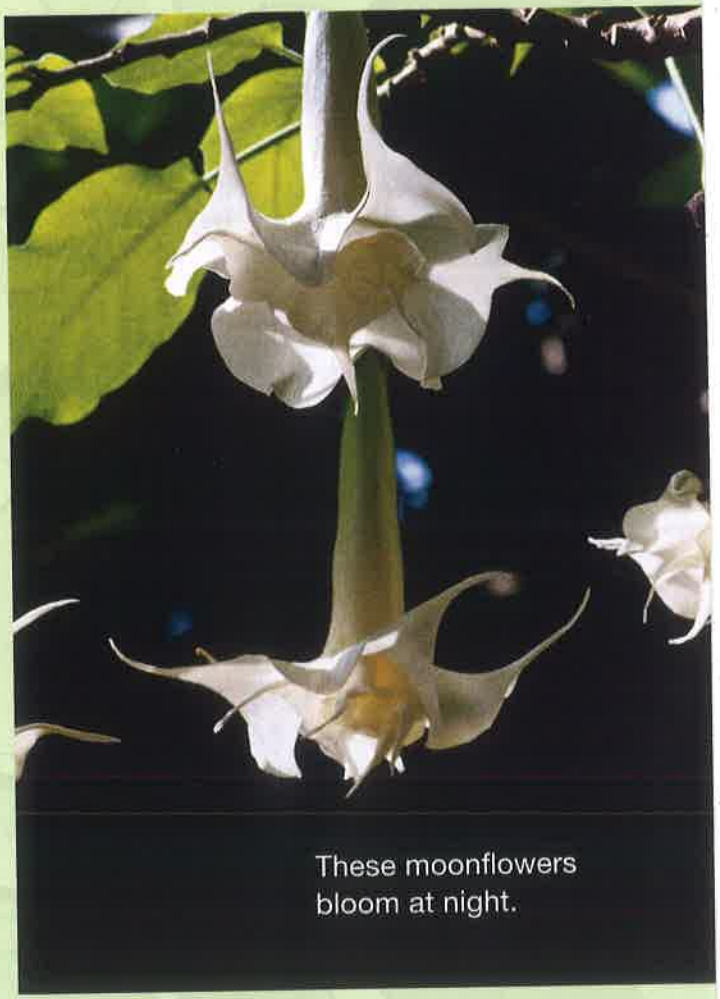
As the moth hovers and drinks, its wings thump against the petals. Its fat, furry body bumps the flower's **stamens,** or the male parts of the flower. These are the parts of the flower that make pollen. The moth knocks the pollen loose. Some sticks to its body.

Then the moth flies to another moonflower to drink more nectar. Some pollen from the first flower falls off. It lands on the second flower's **pistil,** or its female part. This transfer, or movement, of pollen is called **pollination.** This happens only at night for this flower.



A lesser dawn bat drinks nectar.

Flower Parts



These moonflowers bloom at night.

Swell Smells

The moth and the moonflower are partners. Each gets something it needs. The moth gets food. The plant gets help making seeds. This partnership is called **mutualism.**

Night flowers use more than color to attract help. Many use strong smells, too. Some, like the Queen of the Night, smell sweet. This prickly plant doesn't look sweet, though. Most of the year, this cactus looks like a dead bush with sharp thorns. As night falls, it blends into the darkness.

One night a year is different, though. After dark, white flowers as big as plates open along its stems. The pale color stands out. As the flowers open, the smell of vanilla fills the air. It overpowers other desert smells.

Far away, a carpenter bee picks up the smell. Usually, this fat bee is active during the day. In fact, it can't see well in the dark. Yet it can't resist the smell of vanilla. The aroma leads the bee to the cactus. Bats and moths make a beeline for the Queen's flowers, too.

Night flowers often smell stronger than other flowers. That's because it's hard to see these plants in the dark. Smells easily travel on an evening breeze, though. The smells make an invisible trail that leads to the flower.

Sour Power

Flower smells aren't always sweet. Sometimes, they're sour. A giant baobab tree is a good example. High up in the tree's branches, long narrow flower buds grow. They look like bananas. Then the sun sets. The ends of these buds open. The edges curl back, forming purple petals. Inside each one is a creamy white flower. Dozens of stamens coated with pollen stick out from the center.

As the flower opens, it gives off a sour scent. It smells like old watermelon. Nearby, a lemur sniffs the air. It likes the smell.

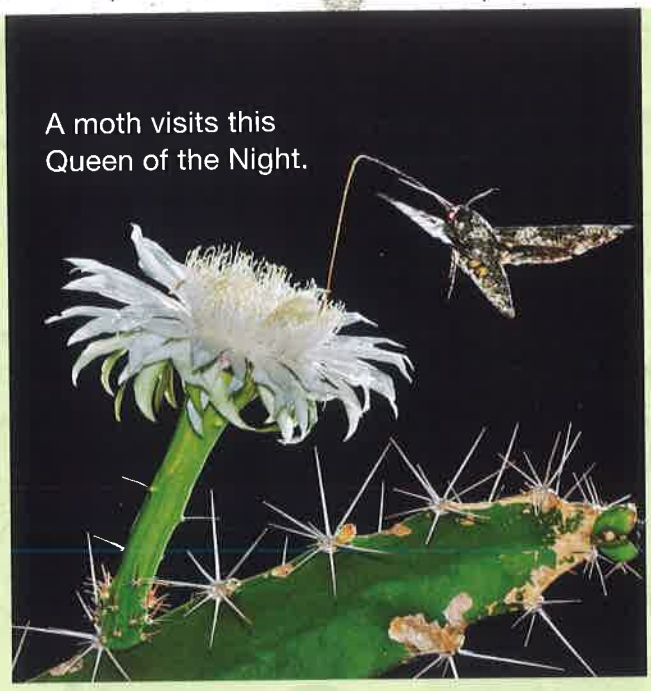
The lemur races to the tree and scrambles among the branches. It sticks its nose into first one flower, then another. As it laps up nectar, pollen coats its fur.

Big Stink

An African sausage tree also smells strong. As its blood-red flowers open, they give off a musty smell. Soon, bats and moths flock to the flowers. Once they are pollinated, fruits that look like sausages grow on the tree.

Some night flowers even smell like rotting flesh. Take the corpse flower. Its deep purple petals look like raw meat. Its center is a pillar of flowers. They smell like something dead.

The smelly bait attracts flies. They crawl over the flowers looking for a treat. Pollen sticks to their feet. The flies move from flower to flower. They spread pollen with each step.



A moth visits this Queen of the Night.

A baobab flower opens at night.

The flowers on this African sausage tree have a strong smell.

Open All Night

Some flowers attract a crowd by offering a lot of food. They are like all-night diners.

In Central America, the sun sets over a balsa tree forest. Dozens of flowers open. A smell of sweet mushrooms rises into the air. It's time for dinner.

Soon, a parade of animals flies, crawls, and swings through the treetops. First comes a troop of capuchin monkeys. A monkey grabs the edge of a balsa flower and laps up all the nectar. Its sharp paws tear the edges of the flower. Full, the monkey moves on.

The flower may be tattered, but it gets a second serving ready. It refills with a fresh supply of nectar. Next, a kinkajou visits. It, too, drinks from the flower. The tree keeps making new nectar. By morning, the tree has made nearly a liter of juice.

The parade of animals continues all night long. Woolly opossums, bats, katydids all visit the flowers. Snakes and praying mantises come by, too. They don't drink nectar. They eat pollinators. By dawn, many of these visitors have carried pollen from flower to flower.

FUN FACTS

- Beetles pollinate 88% of all flowering plants.
- A hawk moth's proboscis is longer than its body.
- Lemurs are the largest known pollinators.
- One nectar bat has a tongue so long that it curls inside its ribcage.

Setting a Trap

To survive rough paws and claws, many night flowers have big, strong petals. That way, animals don't rip them to shreds.

An Amazon water lily uses its strong petals in a different way. This giant, white flower is sturdy and flat. It's strong enough to hold up big beetles—and trap them!

When the lily opens, the sweet smell of pineapple rises. Heat rises, too. The heat and smell attracts beetles. As they burrow into the flower, the flower's petals slowly close around them. There's no way out of the flower. The beetles are trapped.

The next night, the flower reopens. The beetles crawl out, gooey and coated in pollen. The flower turns pink and loses its scent. It doesn't need to attract beetles any more. The beetles find another lily, taking the pollen with them.

Flower Mystery

Scientists are still finding new night flowers. An odd orchid is the latest discovery. It grows deep in a rain forest.

The scientists had a hard time studying this orchid. They expected it to bloom during the day. That's what other orchids do.

Instead, this orchid's flower withered and died during the day. At first, they thought the orchid had a disease. One scientist brought a flower home to study it more closely. At 10 p.m. one night, he noticed that the plant looked different. A flower was opening.

That solved one mystery. This flower still puzzles scientists, though. They don't know how it attracts pollinators. It doesn't have a strong smell. They also don't know what kind of animal pollinates the orchid at night. They think it may attract tiny flies called midges. The flies may think the orchid is a good place to lay their eggs.

The night may hide more flower mysteries. One thing is likely, though. As long as these plants and animals keep helping one another, they may be around for a long time.

WORDWISE

mutualism: a relationship between two organisms in which both benefit

pistil: the female part of a flower, which makes seeds

pollen: tiny grains a plant makes in order to reproduce

pollination: the transfer of pollen from stamens to a pistil

pollinator: an organism that transfers pollen

stamen: the male part of a flower, which makes pollen

A kinkajou looks for nectar in a flower.

This water lily can trap beetles in its petals.

Coming in April

Getting the Shot: Follow a National Geographic photographer as he takes his camera in the ocean.

The Life of Larvae: Find out why some critters look nothing like their parents.

Discovering Deserts: Are all deserts vast, bleak, and empty? No! Learn more.

PICTURE CREDITS

COVER: ALSLUTSKY/SHUTTERSTOCK.COM; COVER LOGO (MONUMENT) MIKENORTON/SHUTTERSTOCK.COM; COVER LOGO (FLOWERS) WADDELL IMAGES/SHUTTERSTOCK.COM; COVER LOGO (BEETLES) VBLINOV/SHUTTERSTOCK.COM; PAGES 2-3, 4-9 (BACKGROUND) © PHEROMONEDESIGN.COM; PAGES 4-5 © ARCO/A. SKONIECZNY/AGE FOTOSTOCK; PAGE 5 © ARCO/NATUREPL.COM; PAGE 6 © THOMAS MARENT/MINDEN PICTURES; PAGE 7 (TOP) © NHPA/PHOTOSHOT; PAGE 7 (BOTTOM) © ALEX WILD/VISUALS UNLIMITED/CORBIS; PAGE 8 © PIOTR NASKRECKI/MINDEN PICTURES; PAGE 9 © MITSUHIKO IMAMORI/MINDEN PICTURES; PAGES 10-11 © MCPHOTOS/AGE FOTOSTOCK; PAGES 12-15 (BACKGROUND) NUTTAKIT/SHUTTERSTOCK.COM; PAGE 12 © STEPHEN EMERSON; PAGE 13 © CHRIS STENGER/FOTO NATURA/MINDEN PICTURES; PAGE 14 © FUNKYSTOCK/AGE FOTOSTOCK; PAGE 15 © JOUAN & RIUS/NATUREPL.COM; PAGES 16-17 ALAN BOSSE; PAGES 18-23 (BACKGROUND) JEFF METZGER/SHUTTERSTOCK.COM; PAGES 18-19 © CH'IEN LEE/MINDEN PICTURES; PAGE 19 (LEFT) © MIXA/AGE FOTOSTOCK; PAGE 19 (RIGHT) © DUPONT/AGE FOTOSTOCK; PAGES 20-21 FRANS LANTING/NATIONAL GEOGRAPHIC STOCK; PAGE 21 (LEFT) © ROLF NUSSBAUMER PHOTOGRAPHY/ALAMY; PAGE 21 (RIGHT) © WARWICK SLOSS/NATUREPL.COM; PAGE 23 (TOP) CAROL FARNETI-FOSTER/GETTY IMAGES; PAGE 23 (BOTTOM) © MAP/NICOLE ET PATRICK/AGE FOTOSTOCK; PAGE 24 © DAVID DOUBILET.

web IWB e-edition

Find your online Teacher's Guide, interactive whiteboard lessons, and projectable editions at **ngpathfinder.org.**

(Note: The Teacher's Guide and activity masters can be printed on either black and white or color printers.)

NATIONAL GEOGRAPHIC Explorer

Vol. 12 No. 5

DEVELOPMENT TEAM
Vice President and Publisher: Francis Downey
Art Director and Designer: Karen Thompson
Editors: Brenna Maloney, Macon Morehouse, Shira Evans
Digital Editor: Shelby Alinsky
Programmer: Meng Wei
Media Editor: Shannon Hibberd
Permissions Editor: Jean Cantu
Production Specialist: Dreama Karnes-Bynane
Research Manager: Christina An
Manufacturing Manager: Nicole Elliott

PUBLISHED BY NATIONAL GEOGRAPHIC LEARNING

NATIONAL GEOGRAPHIC EXPLORER (ISSN 1541-3357) is published seven times during the school year—September, October, November–December, January–February, March, April, May—by National Geographic Learning, 1125 17th Street NW, Washington, D.C. 20036. Postmaster: Please send address changes to NATIONAL GEOGRAPHIC EXPLORER, PO Box 4002865, Des Moines, IA 50340-0597. Periodical postage paid at Washington, D.C., and additional mailing offices.

To subscribe:
In the U.S., call 1-888-915-3276
In Australia and New Zealand, + 61 2 8005 6889
In China, + 86 10 6493 4469
In Hong Kong, + 852 2191 2518
In Malaysia, + 60 3 2782 0243
In Singapore, + 65 6744 9888

Cover: kangaroo beetle

2/13/QGI/1

ISBN 978-1-285-49224-7

FIND US ONLINE