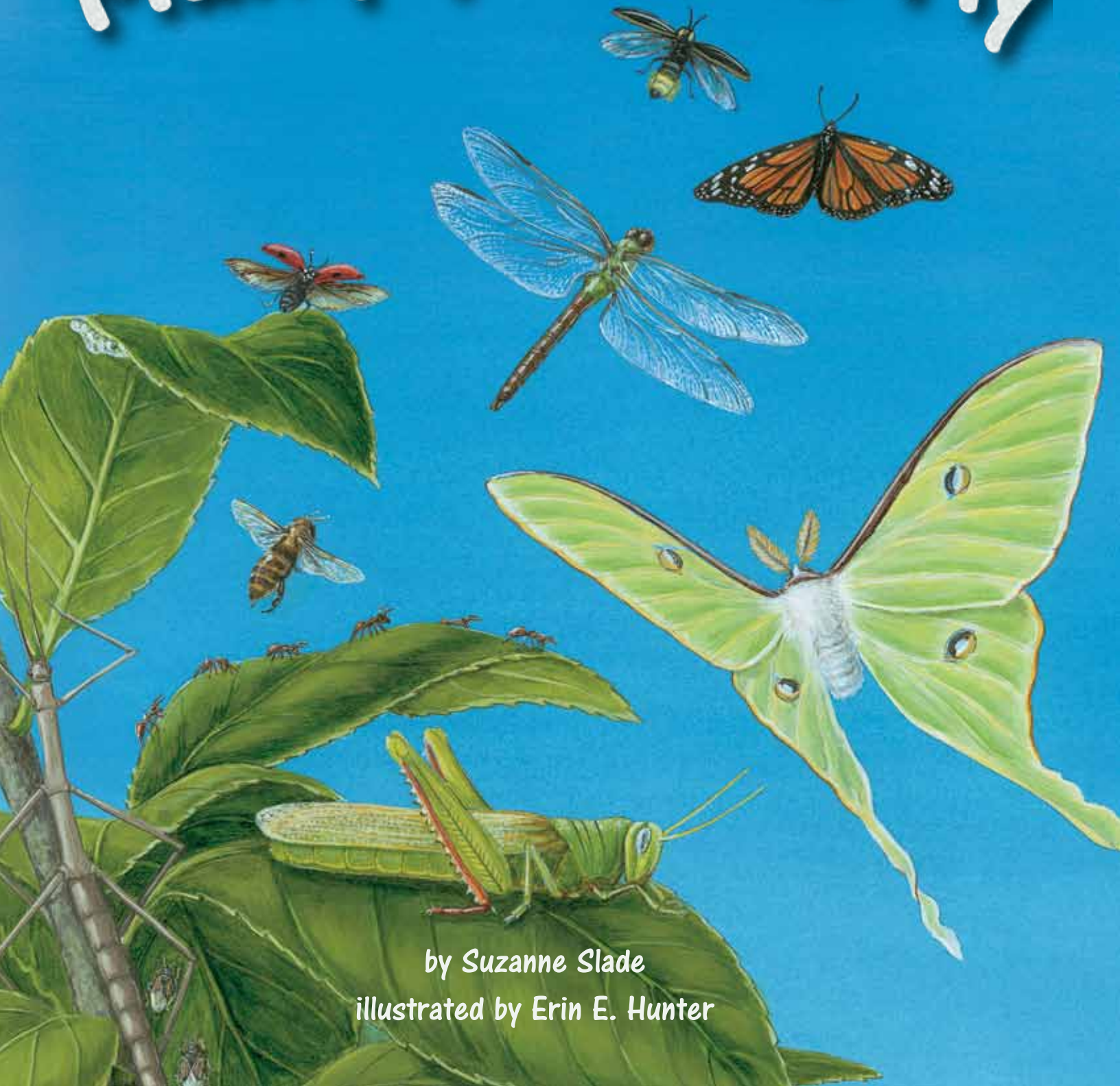


Multiply on the Fly



by Suzanne Slade
illustrated by Erin E. Hunter

Multiply on the Fly

Children will love learning about the world's insects in *Multiply on the Fly*! Following in the footsteps of *What's New at the Zoo?* (addition) and *What's the Difference?* (subtraction), this rhythmic book teaches multiplication in a way that will make children "bug" you for more. Teeming with fun facts, readers will multiply with a variety of insects, including fireflies, grasshoppers, luna moths, dragonflies, ants, honey bees, ladybugs, pirate bugs, walking sticks, butterflies, and spittlebugs.

It's so much more than a picture book . . . this book is specifically designed to be both a fun-to-read story and a launch pad for discussions and learning. Whether read at home or in a classroom, we encourage adults to do the activities with the young children in their lives. Free online resources and support at www.ArbordalePublishing.com include:

- For Creative Minds as seen in the book (in English & Spanish):
 - Insect Body Parts
 - Match the Insects
 - Insect Life Cycles
 - Compare and Contrast
 - Multiplying Numbers
 - Insect Multiplication Table
- Teaching Activities:
 - Reading Questions
 - Language Arts
 - Science
 - Math
 - Geography
 - Coloring Pages
- Interactive Quizzes: Reading Comprehension, For Creative Minds, and Math Word Problems
- English and Spanish Audiobooks
- Related Websites
- Aligned to State Standards (searchable database)
- Accelerated Reader and Reading Counts! Quizzes
- Lexile and Fountas & Pinnell Reading Levels

eBooks with Auto-Flip, Auto-Read, and selectable English and Spanish text and audio available for purchase online.

Thanks to the following people for verifying the accuracy of the insect information in this book: Dr. John Stoffolano, Professor, Department of Plant, Soil & Insect Sciences, University of Massachusetts, and Developer of the University's online Bug Net; and Faith Deering, Museum Educator, Historic Deerfield Museum. And thanks to Dr. Astrida Cirulis, Professor of Mathematics at Concordia University Chicago, and President of Illinois Mathematics Teacher Educators for reviewing the math-related information in the book.



Suzanne Slade is the author of over 80 books for children including *Multiply on the Fly*, *What's the Difference?*, *What's New at the Zoo?*, and *Animals are Sleeping* for Arbordale. Her works include picture books, biographies, as well as many non-fiction titles about animals, sports, and nature. One of her favorite parts of the writing process is researching and learning new things. Suzanne lives near Chicago with her husband, Mike, two children, and their tiny dog, Corduroy.

As both a children's book and scientific illustrator, **Erin Hunter** specializes in entomological and botanical illustrations. She illustrated *Multiply on the Fly* and *A Day on the Mountain* for Arbordale, and she has taught botanical illustration and field sketching at University of California at Santa Cruz. Erin's portfolio includes print and online design projects for clients ranging from marketing firms to culinary groups to educational organizations—and she's drawn insects under a microscope for the Smithsonian's Museum of Natural History. Erin lives with her husband on California's Monterey Peninsula. When she's not sketching and painting, she tends to flowers, fruit trees, and vegetables in her backyard garden.



Suzanne Slade



Erin E. Hunter

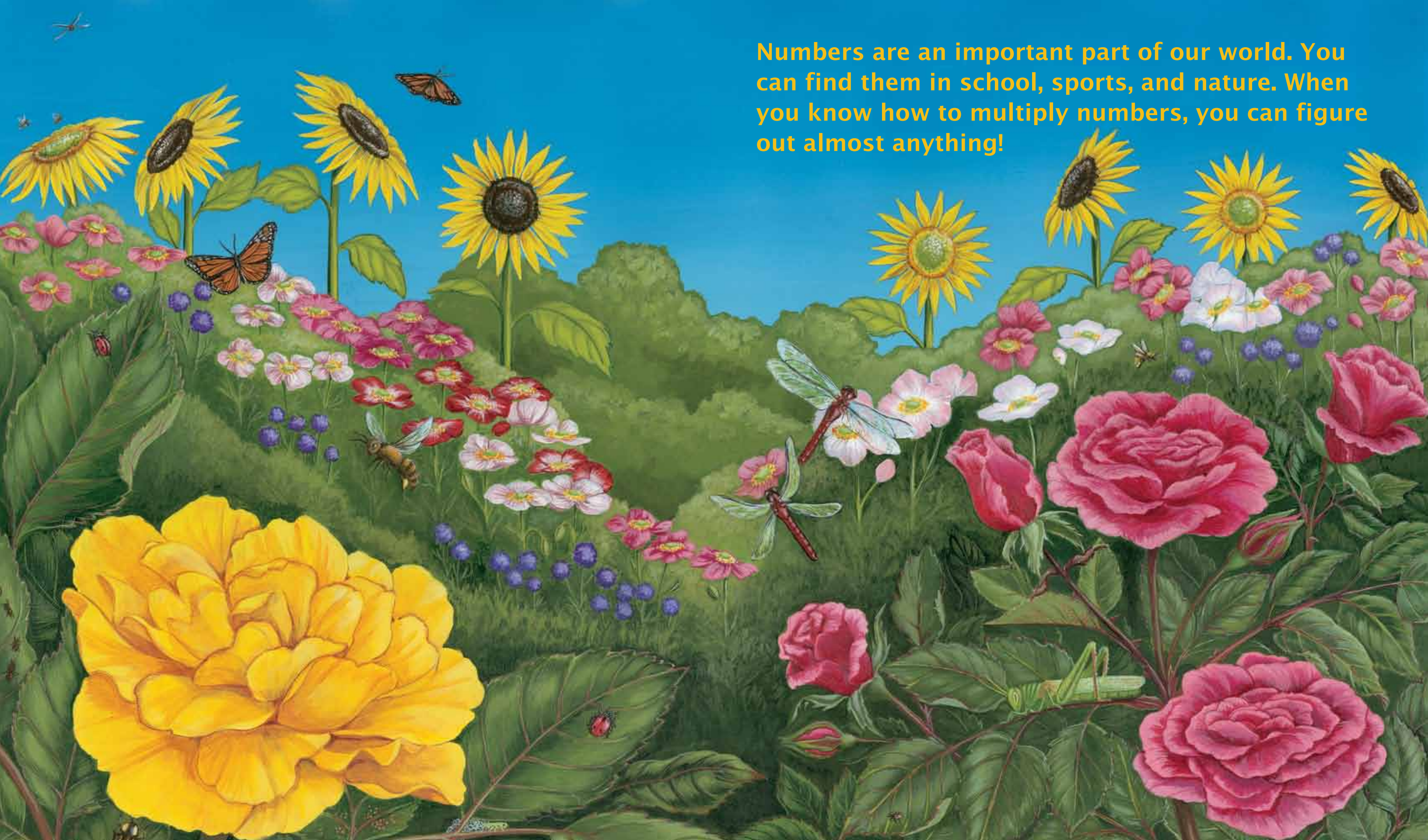
Multiply on the Fly



by Suzanne Slade
illustrated by Erin E. Hunter



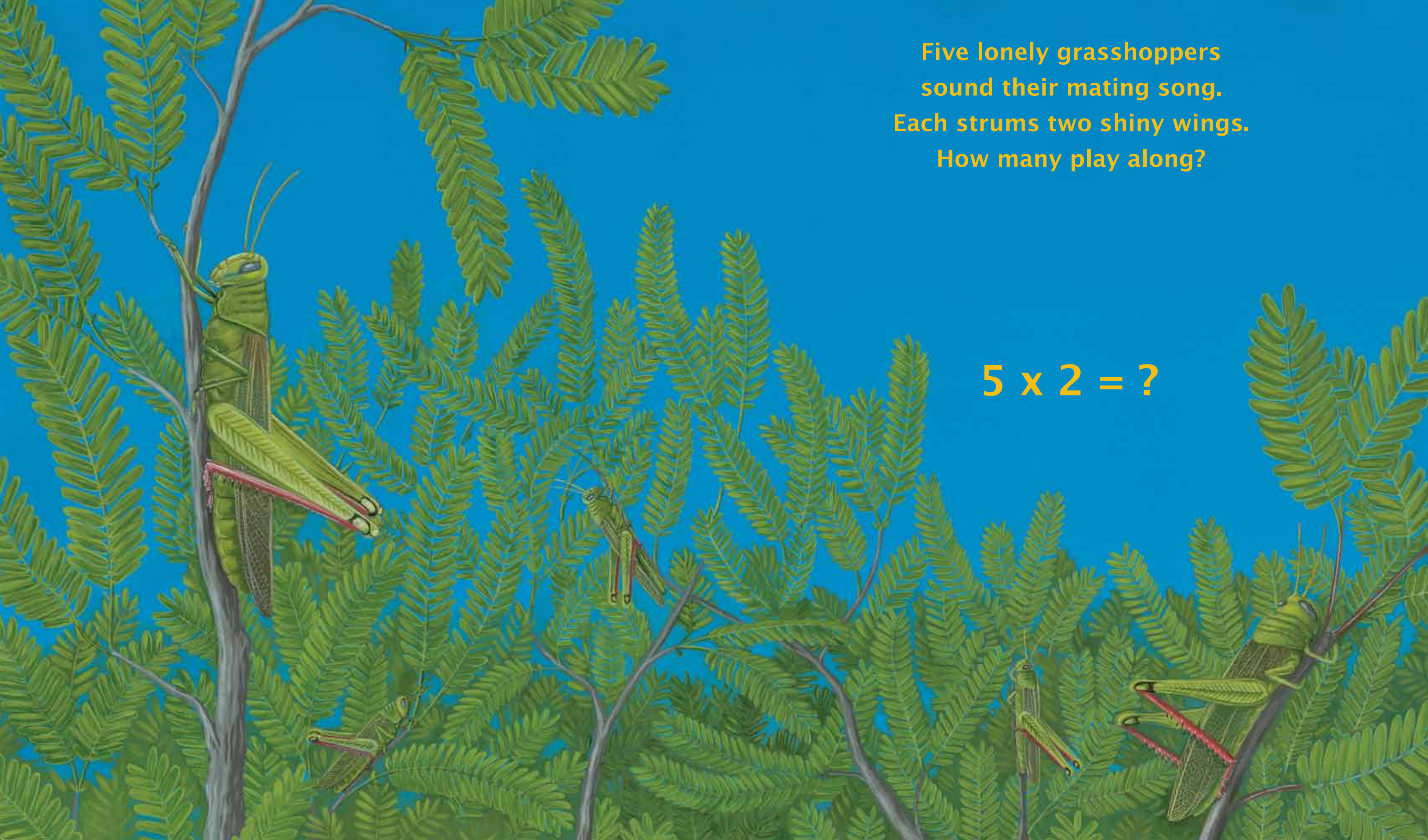
Numbers are an important part of our world. You can find them in school, sports, and nature. When you know how to multiply numbers, you can figure out almost anything!





$$9 \times 1 = ?$$

Nine brilliant fireflies
twinkle in the dark—
glowing lights flash on and off.
How many in the park?

An illustration of five green grasshoppers with red-tipped wings perched on the branches of a tree with feathery green leaves. The background is a solid blue color. The grasshoppers are positioned at various points on the tree: one on the left, one in the center, one at the bottom left, one at the bottom center, and one on the right.

Five lonely grasshoppers
sound their mating song.
Each strums two shiny wings.
How many play along?

$$5 \times 2 = ?$$

For Creative Minds

The For Creative Minds educational section may be photocopied or printed from our website by the owner of this book for educational, non-commercial uses. Cross-curricular teaching activities, interactive quizzes, and more are available online. Go to www.ArbordalePublishing.com and click on the book's cover to explore all the links.

Insect Body Parts

Insects don't have backbones as we do. They have a hard outer covering (called an exoskeleton) on the outside of their bodies.



Most insects have three pairs of legs for walking, swimming, and grabbing prey.

Many adult insects have two pairs of wings.



All bugs are insects, but not all insects are bugs.

Adult insects have three body parts: head, thorax, and abdomen.

The head holds the eyes, antennae, and mouthparts.

The thorax is right behind the head. Wings and legs attach to the thorax.

The abdomen is the back part of the insect and contains the heart and other major organs.



Most insects have one pair of antennae. Insects "wave" their antennae to sense what is around them by smell.



Match the Insects



ant



honey bee



Monarch butterfly



dragonfly



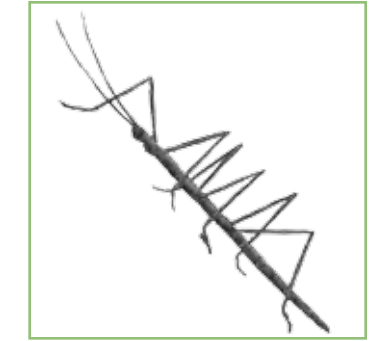
firefly



long-horned grasshopper



ladybug



walking stick

- 1 These night fliers produce light to find mates. If too many outside lights are on, they have trouble finding each other.
- 2 To attract the ladies, these males create a mating call (some call a song). This species (and crickets) rub their two wings together to make their beautiful sound, while other species rub a wing against a leg.
- 3 These beetles eat up to 75 tasty aphids a day. Different kinds have different numbers of black spots on their wings.
- 4 These insects have four oval-shaped wings. They can fly up to 35 mph (56 kilometers per hour)! They can also hover in one place like a helicopter, or fly backwards.
- 5 Imagine having five eyes like this insect! They have two large compound eyes made of many lenses and three simple eyes. The simple eyes are on the forehead in a triangle.
- 6 These insects do special dances to let each other know where to find food. If flowers are near, they move in a circle. If flowers are far, they do a figure eight.
- 7 Their thin body parts look exactly like small twigs. When hungry enemies are near, these insects stay perfectly still.
- 8 To avoid the cold winters, these insects migrate. Some travel 3000 miles (4828 km) to find a warm place to stay during the cold winter.

Answers: 1. fireflies, 2. grasshoppers, 3. ladybugs, 4. monarch butterflies, 5. ants, 6. honey bees, 7. walking sticks, 8. Monarch butterflies

Insect Life Cycles

Eggs hatch into larvae that don't look anything like the adults.

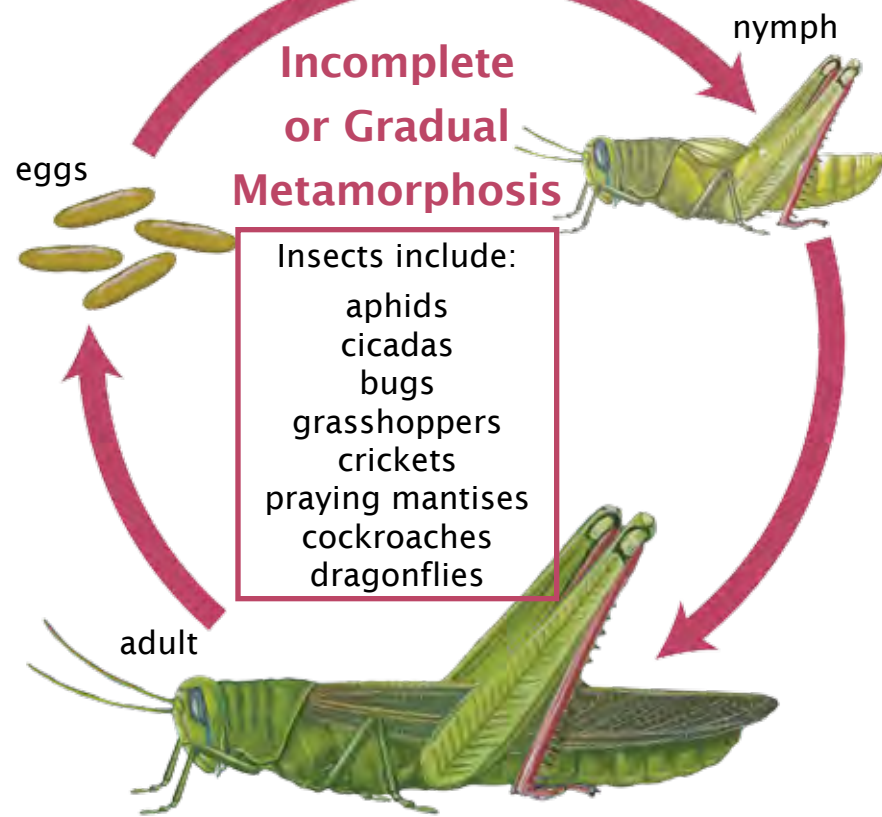
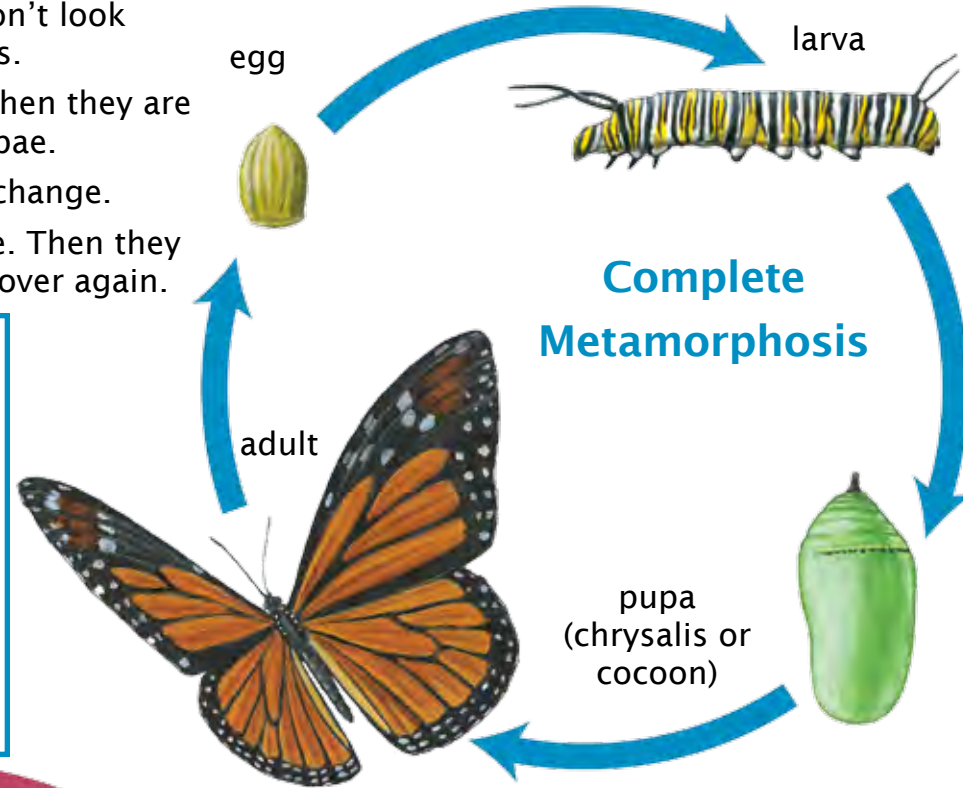
The larvae eat, grow, and molt. When they are grown, they turn into pupae.

The pupa stage is a time of change.

Adult insects emerge from pupae. Then they lay eggs to start the process all over again.

Names of insects and their larvae:
 beetles, bees, wasps—grubs
 butterflies, moths—caterpillars
 mosquitoes—wigglers or larvae
 ants—larvae
 flies—maggots

Amphibians (frogs, toads, and salamanders) also go through a complete metamorphosis. Larvae are called tadpoles or pollywogs.



Insects include:
 aphids
 cicadas
 bugs
 grasshoppers
 crickets
 praying mantises
 cockroaches
 dragonflies

Eggs hatch into nymphs that look like tiny adults without wings.

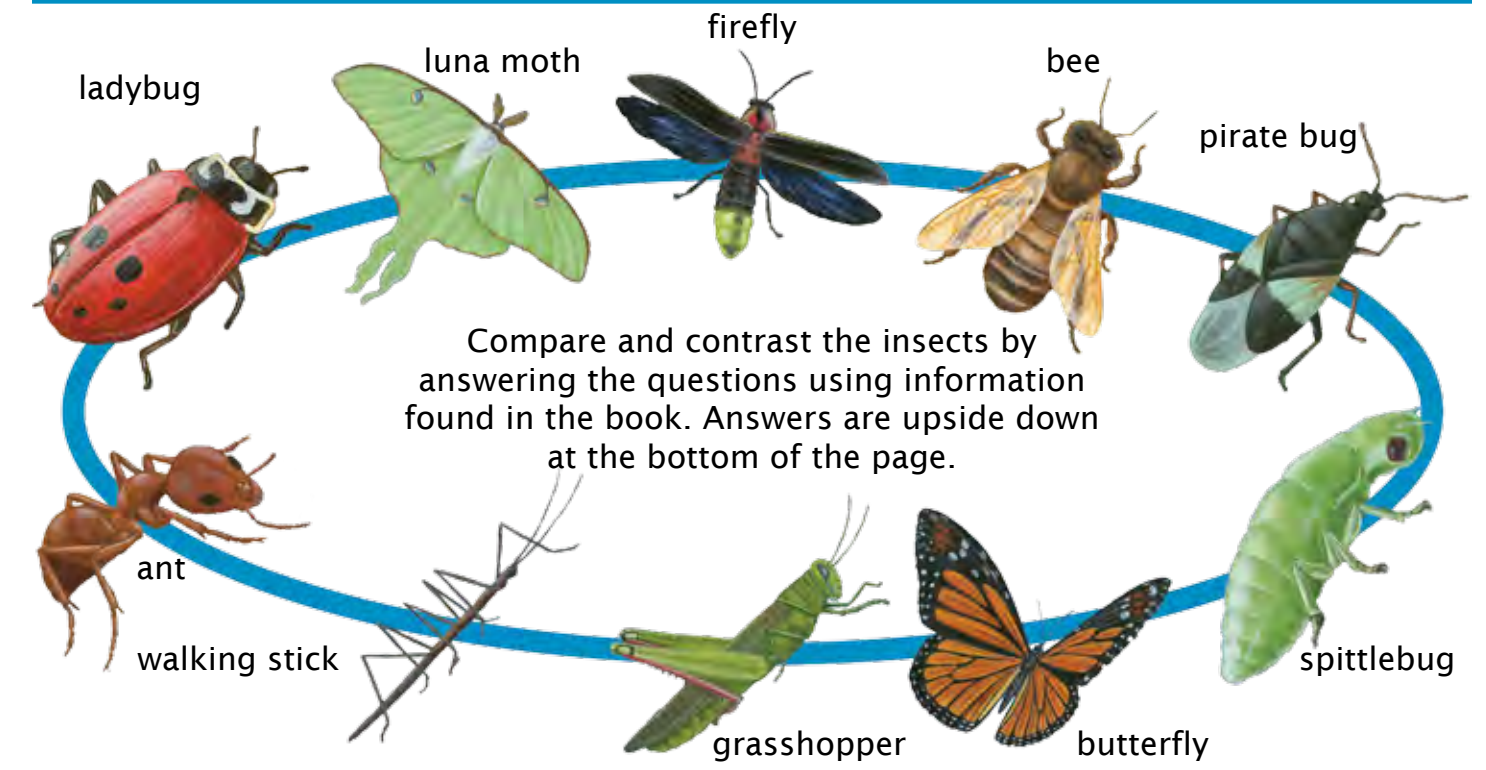
As the nymphs grow, they molt or shed their hard, outer covering and grow a new, bigger one.

Insects usually molt several times before they reach adult size.

Scientists that study insects called Entomologists point out that "gradual metamorphosis" may describe this process better than the commonly used term "incomplete metamorphosis."

These insects go through a gradual change. By the time they've reached adult size, they have grown their wings.

Compare and Contrast

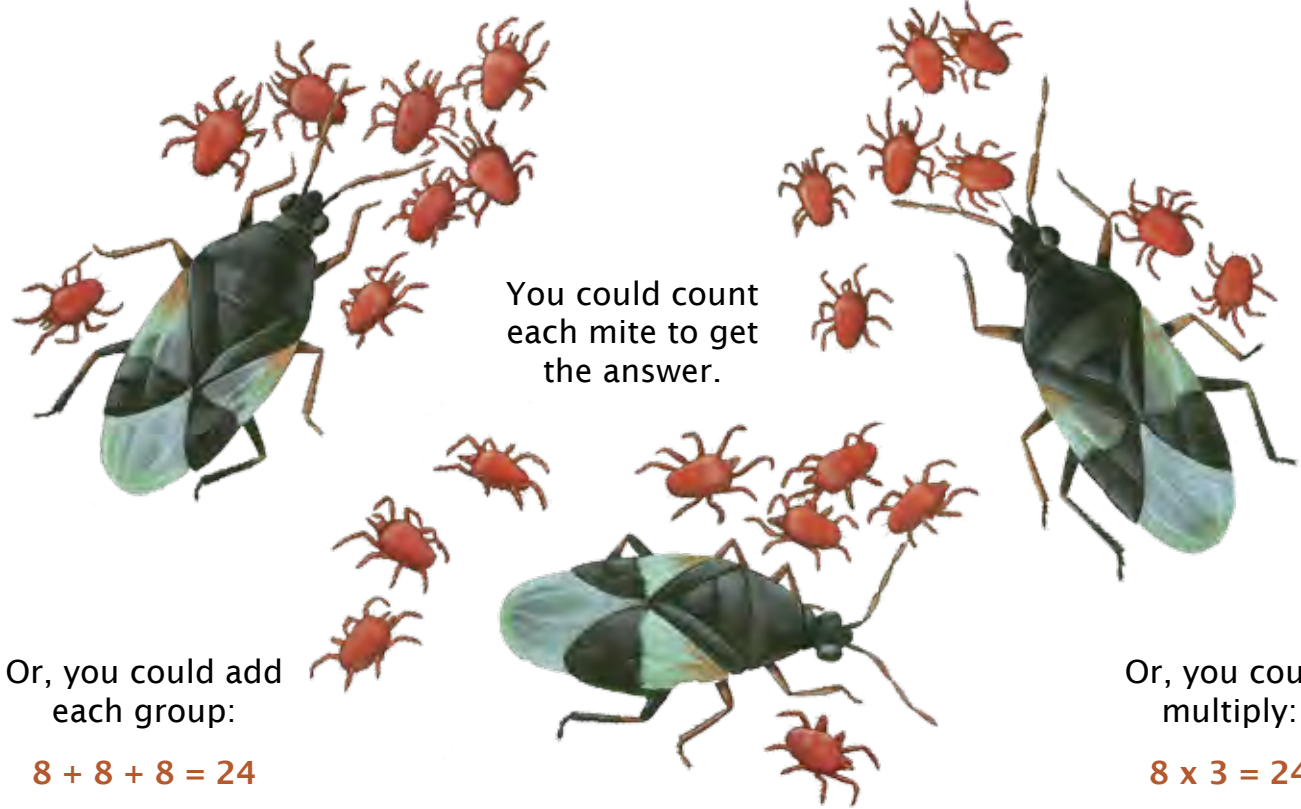


- 1 A ladybug is a type of beetle. What is the ladybug called when it hatches from its egg? Does it undergo complete or incomplete metamorphosis?
- 2 What is a cockroach called when it hatches from its egg? Does it undergo complete or incomplete metamorphosis?
- 3 What are some animals, other than insects, that undergo complete metamorphosis? To what animal group do they belong?
- 4 Ants undergo a complete metamorphosis. At what stage of life are the ants shown in this book?
- 5 Loud music or noise make it difficult for some insects to find mates. Bright outside lights make it difficult for which insect to find a mate?
- 6 Insect legs and wings (if they have wings) attach to what part of their body?
- 7 How do insects use their antennae? What part of our body do we use for that?
- 8 Insects are classified as "invertebrates" because they do not have backbones. What kind of skeleton do they have?

Answers: 1) grub/complete, 2) nymph/incomplete, 3) frogs, toads, and salamanders/amphibians, 4) adults, 5) fireflies, 6) thorax, 7) sense of smell/our noses, 8) insects have hard, outer coverings (exoskeletons)

Multiplying Numbers

3 pirate bugs x 8 mites each = how many mites?



You could count each mite to get the answer.

Or, you could add each group:

$$8 + 8 + 8 = 24$$

Or, you could multiply:

$$8 \times 3 = 24$$

9 fireflies x 1 light each = how many lights? $9 \times 1 = ?$

5 grasshoppers x 2 wings each = how many wings? $2 + 2 + 2 + 2 + 2 = ?$ or $5 \times 2 = ?$

4 luna moths x 3 inches long = how many inches? $3 + 3 + 3 + 3 = ?$ or $4 \times 3 = ?$

8 dragonflies x 4 wings each = how many wings? $4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 = ?$ or $8 \times 4 = ?$

6 ants x 5 eyes each = how many eyes? $5 + 5 + 5 + 5 + 5 + 5 = ?$ or $6 \times 5 = ?$

4 honey bees x 6 legs each = how many legs? $6 + 6 + 6 + 6 = ?$ or $4 \times 6 = ?$

8 ladybugs x 7 spots each = how many spots? $7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 = ?$ or $8 \times 7 = ?$

7 walking sticks x 9 parts = how many parts? $9 + 9 + 9 + 9 + 9 + 9 + 9 = ?$ or $7 \times 9 = ?$

6 swarms of 10 butterflies = how many butterflies? $10 + 10 + 10 + 10 + 10 + 10 = ?$ or $6 \times 10 = ?$























2 spittlebugs x 11 bubbles = how many bubbles? $11 + 11 = ?$ or $2 \times 11 = ?$

Insect Multiplication Table

It's best to memorize the basic multiplication facts. Until then, you can use a multiplication table to help find the answer. The top row and left-side column of numbers (in yellow) represent the numbers to be multiplied. To find the answer, run your finger over and down to where the row and column meet.

Do you think it matters which number is in the top row or first column?

Can you find any patterns in the numbers?

x	1	2	3	4	5	6	7	8	9	10	11
1	1	2	3	4	5	6	7	8		10	11
2	2	4	6	8		12	14	16	18	20	
3	3	6	9		15	18	21		27	30	33
4	4	8		16	20		28		36	40	44
5	5		15	20	25		35	40	45	50	55
6	6	12	18			36	42	48	54		66
7	7	14	21	28	35	42	49			70	77
8	8	16			40	48		64	72	80	88
9		18	27	36	45	54		72	81	90	99
10	10	20	30	40	50		70	80	90	100	110
11	11		33	44	55	66	77	88	99	110	121

More multiplication activities are in the free online activities available on the book's homepage at www.ArbordalePublishing.com.

Answers: 9 fireflies x 1 light each = 9 lights; 5 grasshoppers x 2 wings each = 10 wings; 4 luna moths x 3 inches long = 12 inches; 8 dragonflies x 4 wings each = 32 wings; 6 ants x 5 eyes each = 30 eyes; 4 honey bees x 6 legs each = 24 legs; 8 ladybugs x 7 spots each = 56 spots; 7 walking sticks x 9 parts = 63 parts; 6 swarms of 10 butterflies = 60 butterflies; 2 spittlebugs x 11 bubbles = 22 bubbles

With love to the best flyer I know, Brigadier General Fredric Buckingham (Ret), and his wife, Diane—SS

To Mom and Dad, who encouraged me to draw, and taught me to love nature (especially bugs)—EH

Thanks to the following people for verifying the accuracy of the insect information in this book:

- Dr. John Stoffolano, Professor, Department of Plant, Soil & Insect Sciences, University of Massachusetts, and Developer of the University's online Bug Net
- Faith Deering, Museum Educator, Historic Deerfield Museum

And thanks to Dr. Astrida Cirulis, Professor of Mathematics at Concordia University Chicago and President of Illinois Mathematics Teacher Educators, for reviewing the math-related information in the book.

Library of Congress Cataloging-in-Publication Data

Slade, Suzanne.

Multiply on the fly / by Suzanne Slade ; illustrated by Erin E. Hunter.

p. cm. -- (What's new at the zoo?) (What's the difference?)

ISBN 978-1-60718-128-6 (hardcover) -- ISBN 978-1-60718-138-5 (softcover) -- ISBN 978-1-60718-148-4

(English ebook) -- ISBN 978-1-60718-158-3 (Spanish ebook) 1. Multiplication--Juvenile literature. 2. Insects--

Juvenile literature. I. Hunter, Erin E. ill. II. Title.

QA115.S64 2011

513.2'13--dc23

2011019886

Also available as eBooks featuring auto-flip, auto-read, 3D-page-curling, and selectable English and

Spanish text and audio

Interest level: 004-009

Grade level: P-4

Lexile Level: Lexile Code: AD

Curriculum keywords: compare/contrast, life

cycle: metamorphosis, life cycles: animals,

multiply/divide, classification (invertebrates)

Text Copyright 2011 © Suzanne Slade

Illustration Copyright 2011 © by Erin E. Hunter

The "For Creative Minds" educational section may

be copied by the owner for personal use or by

educators using copies in classroom settings



Arbordale Publishing
Formerly Sylvan Dell Publishing
Mt. Pleasant, SC 29464
www.ArbordalePublishing.com



If you enjoy this book,
look for other Arbordale books in this series:



Includes 6 pages of
learning activities.
Look for more free activities
online at
www.ArbordalePublishing.com