



Teacher's Guide

Insects

Dear Educator,

Insects are found almost everywhere on Earth. In **KIDS DISCOVER Insects**, your young scientists will find out about the physical features and lives of insects and about the interactions between insects and humans.

This Teacher's Guide is filled with activity ideas and blackline masters that can help your students learn more about insects. Select or adapt the activities that suit your students' needs and interests best.

Thank you for making **KIDS DISCOVER** a part of your classroom agenda.

Sincerely,

KIDS DISCOVER

P.S. We would love to hear from you. E-mail your comments and ideas to teachers@kidsdiscover.com

Meeting the Standards

Life Science

- ✓ Characteristics of organisms
- ✓ Life cycles of organisms
- ✓ Organisms and environments
- ✓ Diversity and adaptations of organisms
- ✓ Visit www.kidsdiscover.com/standards to find out more about how **KIDS DISCOVER** meets state and national standards.

PAGES WHAT'S IN INSECTS

2-3 It's a Big Small World

With as many as three million species worldwide, insects have a big effect on our lives.

4-5 Creature Features

All insects share certain features, such as three-part bodies and antennae.

6-7 Growing Up

Insects grow from eggs to adults in a process called metamorphosis.

8-9 Insect Menus

Some insects are herbivores; others, such as parasites, are carnivores.

10-11 Insect Helpers

An ant and an aphid have a symbiotic relationship.

12-13 Living Together

Ants, bees, and termites live and work in groups.

14-15 Hide and Seek

Camouflage and mimicry protect insects from predators.

16-17 What on Earth?

Unusual insects can be found in just about any environment.

18-19 Game Pages

Puzzles, activities, and reading recommendations fill these pages.

• IN THIS TEACHER'S GUIDE •

2 Prereading Activities

3 Get Set to Read (Anticipation Guide)



4 Discussion & Writing Questions

5-6 It's in the Reading (Reading Comprehension)



7 Everything Visual (Graphic Skills)



8 Cross-Curricular Extensions

9-12 Answer Keys to Blackline Masters

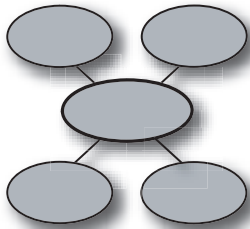
PREREADING ACTIVITIES

Before distributing **KIDS DISCOVER *Insects***, activate students' prior knowledge with these activities.

Discussion

To get students thinking about how this topic relates to their interests and lives, ask:

- ✓ *What are some insects you are familiar with?*
- ✓ *What are some positive and negative effects of insects on your life?*



Concept Map

Explain to students that they will be reading *Insects*. Ask: *What are some words related to insects?* List students' responses on the board. (See box below for some terms they may

suggest.) After creating a list, ask students to group the words into categories related to insects—**People, Plants, Animals, and Products**. Create a concept map by writing *Insects* on the board and circling it. Write the categories around the circle and draw lines between the ideas to show the connections. Then list examples and write the words from the list around the appropriate categories. Encourage students to add more words to the concept map as they read *Insects*.

KEY TERMS

- | | |
|---------------|-----------------|
| ✓ bug | ✓ species |
| ✓ honey | ✓ metamorphosis |
| ✓ bees | ✓ butterfly |
| ✓ mosquito | ✓ carnivore |
| ✓ flea | ✓ herbivore |
| ✓ antennae | ✓ parasite |
| ✓ wings | ✓ symbiosis |
| ✓ grasshopper | ✓ nest |
| ✓ mouthparts | ✓ camouflage |
| ✓ caterpillar | ✓ mimicry |

Get Set to Read (Anticipation Guide)



Copy and distribute the **Get Set to Read** blackline master (page 3 of this Teacher's Guide). Explain to students that this **Anticipation Guide** will help them find out what they know and what misconceptions they have about the topic. **Get Set to Read** is a list of statements—some true, some false. Ask students to write whether they think each statement is true or false in the **Before Reading** column. Be sure to tell students that it is not a test and they will not be graded on their answers. The activity can be completed in a variety of ways for differentiated instruction:

- ◆ **Have students** work on their own or in small groups to complete the page.
- ◆ **Assign pairs** of students to focus on two statements and to become "experts" on these topics.
- ◆ **Ask students** to complete the **Before Reading** column on their own, and then tabulate the class's answers on the chalkboard, on an overhead transparency, or on your classroom computer.
- ◆ **Review the statements** orally with the entire class.

If you predict that students will need assistance finding the answers, complete the **Page Number** column before copying **Get Set to Read**.

Preview

Distribute *Insects* and model how to preview it. Examine **titles, headings, words in boldface, pictures, charts, and captions**. Then have students add new information to the **concept map**. If students will be reading a only few pages at one sitting, preview only the selected pages.

BE WORD WISE WITH POWER VOCABULARY!

You have exclusive access to additional resources including Power Vocabulary blackline masters for every available **KIDS DISCOVER** title! These activities introduce students to 15 specialized and general-use vocabulary words from each **KIDS DISCOVER** title. Working with both types of words helps students develop vocabulary, improve comprehension, and read fluently. Follow the links from your Teacher's Toolbox CD-ROM and find your title to access these valuable resources:

- ◆ Vocabulary cards
- ◆ Crossword puzzle
- ◆ Word find
- ◆ Matching
- ◆ Cloze sentences
- ◆ Dictionary list



Name _____ Date _____

Get Set to Read

What do you know about insects? In **Before Reading**, write *true* if you think the statement is true. Write *false* if you think the statement is not true. Then read **KIDS DISCOVER Insects**. Check back to find out if you were correct. Write the correct answer and its page number.

CHALLENGE: Rewrite each false sentence in a way that makes it true.

Before Reading		After Reading	Page Number
_____	1. Most of our fruit and vegetable plants could not survive without insects.	_____	_____
_____	2. Adult insects have four pairs of legs.	_____	_____
_____	3. The grasshopper has the best vision of any insect.	_____	_____
_____	4. An insect's skeleton is on the outside of its body.	_____	_____
_____	5. Most insects shed their skin four or five times before adulthood.	_____	_____
_____	6. Most insects eat only plants.	_____	_____
_____	7. Insects do not have cooperative relationships with different insect species.	_____	_____
_____	8. Termites live in towers that can be as high as 40 feet.	_____	_____
_____	9. Some caterpillars attach flower petals to themselves for camouflage.	_____	_____
_____	10. The bee family is the largest in the insect world.	_____	_____



DISCUSSION & WRITING QUESTIONS

Use the following questions as discussion starters or as writing prompts for journals. For additional in-class discussion and writing questions, adapt the questions on the reading comprehension blackline masters on pages 5 and 6.

Cover

- ✓ *If the photograph is not of a bug, what do you think it might be?*
- ✓ *What insects do you think might have singing wings, drumming knees, and swords?*

Pages 2–3

Insects are found almost everywhere on Earth, with up to three million species worldwide. Ask:

- ✓ *How do bugs differ from other insects?*
- ✓ *How have wings helped insects live successfully?*
- ✓ *What are some positive and some negative interactions between insects and humans?*

Pages 4–5

All insects share certain features. Ask:

- ✓ *How do the bodies of insects and of spiders differ?*
- ✓ *How does a male cricket attract a female? How does the cricket do this?*
- ✓ *What are an insect's tracheae? What function do they have?*

Pages 6–7

Insects grow in a series of distinct changes. Ask:

- ✓ *Why is it impossible for insects to grow little by little? What do they do instead?*
- ✓ *What is the series of changes from egg to adult in an insect called? What are the four stages of this growth in a butterfly?*
- ✓ *What is unusual about the life cycle of a cicada?*

Pages 8–9

Different insect species have different diets. Ask:

- ✓ *What are the eating habits of most insect herbivores?*
- ✓ *What do aphids eat? How do they eat it? What insect preys on aphids?*
- ✓ *Why are blood-feeding parasites the most dangerous to people? What are some examples of these?*

Pages 10–11

Ants and aphids have a mutually beneficial relationship. Ask:

- ✓ *What is the name of the kind of relationship shared by ants and aphids? How does their relationship work?*

Pages 12–13

Some insect species live together and function as a family group. Ask:

- ✓ *How do ants communicate with one another?*
- ✓ *How does working together help social insects, such as army ants, survive?*
- ✓ *What are some different individuals in a termite nest? What unique traits does each have?*

Pages 14–15

Insects have unique methods to protect themselves from predators. Ask:

- ✓ *How does camouflage help katydids, grasshoppers, and caterpillars?*
- ✓ *How do some kinds of moths, katydids, and flies use mimicry to protect themselves?*

Pages 16–17

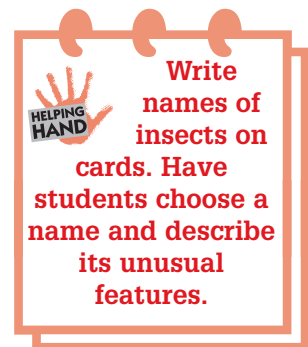
Some insects have unusual sizes, shapes, or colors. Ask:

- ✓ *What unusual features do the planthopper, forest caterpillar, and some other caterpillars have? How do these features help these insects?*
- ✓ *What are some insects with features that make them look beautiful? Describe the features.*

All Pages

After students read the issue, ask:

- ✓ *Identify three facts you have learned about insects in this issue of KIDS DISCOVER.*



Name _____ Date _____

It's in the Reading

After reading **KIDS DISCOVER *Insects***, choose the best answer for each question.
Fill in the circle.



Find your answer on the pages shown in the book icon next to each question.

1. Which insect has a negative interaction with humans by eating human food?

- ☐ A. mosquito
- ☐ B. bee
- ☐ C. flea
- ☐ D. hornworm caterpillar



2. Which are an insect's main sense organs?

- ☐ A. antennae
- ☐ B. tracheae
- ☐ C. thorax
- ☐ D. legs



3. What is the first thing that happens when an insect's skin becomes too small?

- ☐ A. A soft new skin develops underneath.
- ☐ B. The old skin splits down the back.
- ☐ C. The insect crawls out of the old skin.
- ☐ D. A new skin hardens.



4. In which stage does a caterpillar hang upside down and fasten itself to a plant?

- ☐ A. egg
- ☐ B. larva
- ☐ C. chrysalis
- ☐ D. adult



5. In which category is a termite, an insect that eats only wood?

- ☐ A. parasites
- ☐ B. carnivores
- ☐ C. herbivores
- ☐ D. blood feeders



It's in the Reading (continued)

6. Why is the relationship between ants and aphids considered symbiosis?

- ☐ A. The aphid gets benefits by living off the ant.
- ☐ B. The ant gets benefits by eating the aphid.
- ☐ C. Neither one benefits from the relationship.
- ☐ D. Both benefit from the relationship.



7. Which is not a benefit of living in family groups for social insects?

- ☐ A. doing only one job instead of many
- ☐ B. having more plentiful food
- ☐ C. never being attacked by predators
- ☐ D. having help caring for the young



8. What kind of insect is most often mimicked in the practice of mimicry?

- ☐ A. a beautiful one
- ☐ B. a large one
- ☐ C. a plentiful one
- ☐ D. a dangerous one



9. Which is an example of insect camouflage?

- ☐ A. a treehopper that looks like a thorn
- ☐ B. a caterpillar that looks like a snake
- ☐ C. a moth that looks like a yellow-jacket wasp
- ☐ D. a wasp that lives in a hornets' nest



10. How long is the largest beetle on Earth?

- ☐ A. about 1/2 inch
- ☐ B. about 7 inches
- ☐ C. about 20 inches
- ☐ D. about 5 feet



11. Suppose a state had a plan to use insecticides to kill all harmful insects, such as those that eat crops and carry disease. Would you agree or disagree with this action? Why?



Name _____ Date _____

Everything Visual

Diagrams point out and describe the parts of a person, place, or thing. Use the diagram on pages 12–13 to answer these questions.

1. How is the temperature of the tower kept stable?

2. What occurs in the royal chamber and in the nursery of the tower?

3. Why is the fungus garden an important part of the tower?

4. Describe the walls of the tower. How do they make the tower livable?

5. What runs up the center length of the tower? What is its purpose?

6. Why does the diagram include a person climbing on the tower?



Science/Social Studies

- ◆ Help students use the Internet to find out about an insect that is harmful to people by eating human crops or carrying human diseases. Have them find out what is done to prevent the harmful effects of the insect. Have them describe their findings in a magazine article.

Language Arts

- ◆ Have students write an imaginative short story based on the insect world. For example, they might write from an insect character's point of view or describe events that take place in an anthill or termite tower.

Science / Art

- ◆ Have students create a detailed illustration of an insect. Students can display their artwork on a bulletin board.

Science

- ◆ Have students choose a category of unusual insects such as the largest, smallest, ugliest, or with the most unusual eating habits. Have them create a poster that illustrates, labels, and describes some insects in the category.

Science

- ◆ Have students research an order (major group) of insects such as orthoptera (crickets and grasshoppers) or lepidoptera (butterflies and moths). Have them make a poster showing some members of the order and some facts about them.

Science

- ◆ Encourage students to study a common insect such as an ant or a fly. Have them write a detailed, factual description of the insect's appearance and behavior.

Language Arts

- ◆ Explain to students that an idiom is an expression with a meaning that differs from the meaning of its individual words. Have students make a booklet of insect idioms, illustrating the figurative meaning of the idiom and citing the literal meaning. Offer these examples: busy as a bee, there's a fly in the ointment, be a fly on the wall, make a beeline for, put a bug in someone's ear, as snug as a bug in a rug, butterflies in your stomach.

Mathematics/Art

- ◆ Give students a pattern for a regular hexagon. They can use the pattern to draw a honeycomb. Suggest that students add a few bees in some of the cells of their honeycombs.

Language Arts/Drama

- ◆ Together with students adapt Aesop's fable "The Ant and the Grasshopper" into a play. Once the play is written, students can stage a production of the fable. Encourage groups of students to prepare scenery and props, serve as stagehands, and make costumes, as well as perform in the production.





Name **ANSWER KEY** Date _____

Get Set to Read

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CHALLENGE: Rewrite each false sentence in a way that makes it true.

Before Reading		After Reading	Page Number
_____	1. Most of our fruit and vegetable plants could not survive without insects.	<u>True</u>	<u>pp. 2–3</u>
_____	2. Adult insects have four three pairs of legs.	<u>False</u>	<u>pp. 4–5</u>
_____	3. The grasshopper dragonfly has the best vision of any insect.	<u>False</u>	<u>pp. 4–5</u>
_____	4. An insect's skeleton is on the outside of its body.	<u>True</u>	<u>pp. 6–7</u>
_____	5. Most insects shed their skin four or five times before adulthood.	<u>True</u>	<u>pp. 6–7</u>
_____	6. Most Some insects eat only plants.	<u>False</u>	<u>pp. 8–9</u>
_____	7. Some insects do not have cooperative relationships with different insect species.	<u>False</u>	<u>pp. 10–11</u>
_____	8. Termites live in towers that can be as high as 40 feet.	<u>True</u>	<u>pp. 12–13</u>
_____	9. Some caterpillars attach flower petals to themselves for camouflage.	<u>True</u>	<u>pp. 14–15</u>
_____	10. The bee beetle family is the largest in the insect world.	<u>False</u>	<u>pp. 16–17</u>

Name **ANSWER KEY** _____ Date _____

It's in the Reading

After reading **KIDS DISCOVER *Insects***, choose the best answer for each question.
Fill in the circle.

Find your answer on the pages shown in the book icon next to each question.

1. Which insect has a negative interaction with humans by eating human food?

- ☐ A. mosquito
- ☐ B. bee
- ☐ C. flea
- ☒ D. hornworm caterpillar (*details*)



2. Which are an insect's main sense organs?

- ☒ A. antennae (*details*)
- ☐ B. tracheae
- ☐ C. thorax
- ☐ D. legs



3. What is the first thing that happens when an insect's skin becomes too small?

- ☒ A. A soft new skin develops underneath. (*steps in a process*)
- ☐ B. The old skin splits down the back.
- ☐ C. The insect crawls out of the old skin.
- ☐ D. A new skin hardens.



4. In which stage does a caterpillar hang upside down and fasten itself to a plant?

- ☐ A. egg
- ☐ B. larva
- ☒ C. chrysalis (*details*)
- ☐ D. adult



5. In which category is a termite, an insect that eats only wood?

- ☐ A. parasites
- ☐ B. carnivores
- ☒ C. herbivores (*classification*)
- ☐ D. blood feeders



It's in the Reading (continued)

6. Why is the relationship between ants and aphids considered symbiosis?

- ☐ A. The aphid gets benefits by living off the ant.
- ☐ B. The ant gets benefits by eating the aphid.
- ☐ C. Neither one benefits from the relationship.
- ☒ D. Both benefit from the relationship. (*word meaning*)



7. Which is not a benefit of living in family groups for social insects?

- ☐ A. doing only one job instead of many
- ☐ B. having more plentiful food
- ☒ C. never being attacked by predators (*draw conclusions*)
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- ☒ D. a dangerous one (*word meaning*)



9. Which is an example of insect camouflage?

- ☒ A. a treehopper that looks like a thorn (*draw conclusions*)
- ☐ B. a caterpillar that looks like a snake
- ☐ C. a moth that looks like a yellow-jacket wasp
- ☐ D. a wasp that lives in a hornets' nest



10. How long is the largest beetle on Earth?

- ☐ A. about 1/2 inch
- ☒ B. about 7 inches (*details*)
- ☐ C. about 20 inches
- ☐ D. about 5 feet



11. Suppose a state had a plan to use insecticides to kill all harmful insects, such as those that eat crops and carry disease. Would you agree or disagree with this action? Why?

Essay: Students should conclude that it would be impossible to kill all harmful insects without also killing beneficial ones. It could also upset the balance of nature; for example, insects that are helpful to humans might lose their insect prey and also die. In addition, insecticides can be harmful to people and other animals.



Name **ANSWER KEY** Date _____

Everything Visual

Diagrams point out and describe the parts of a person, place, or thing. Use the diagram on pages 12–13 to answer these questions.

1. How is the temperature of the tower kept stable?

Cool air flows up from the bottom and filters through the chambers.

2. What occurs in the royal chamber and in the nursery of the tower?

The queen lays eggs in the royal chamber; the workers feed young termites in the nursery.

3. Why is the fungus garden an important part of the tower?

The fungus provides food for the termites.

4. Describe the walls of the tower. How do they make the tower livable?

The walls are hard and porous and have air vents, allowing oxygen to be absorbed.

5. What runs up the center length of the tower? What is its purpose?

The main chimney runs up the center, allowing hot air to escape.

6. Why does the diagram include a person climbing on the tower?

It allows readers to compare the tower's height to the person's height to understand how tall the tower is.