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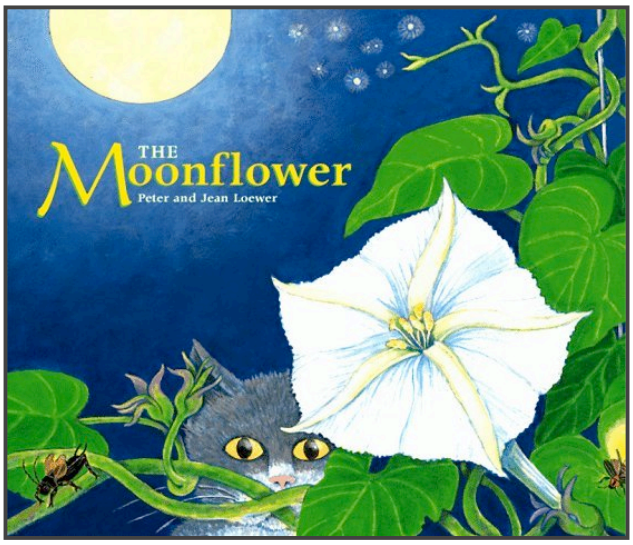
SUGGESTIONS FOR TEACHERS AND LIBRARIANS
Peachtree Publishers, Ltd. 1700 Chattahoochee Avenue Atlanta, GA 30318-2112

The Moonflower

Written by Peter Loewer
Illustrated by Jean Loewer

ISBN: 1-56145-138 / $15.95 / Hardcover
ISBN 1-56145-314-5 / $7.95 / Trade Paperback
10 x 8-1/2 inches; 32 pages
Children's /Nature; Ages 6-10



About the Book

The moonflower begins to unfurl as dusk fades into darkness...

A relative of morning glories and sweet potatoes, the moonflower opens its splendid white blooms on dark summer evenings, attracting the hawkmoths that will spread its pollen from flower to flower. Stars of the Milky Way galaxy shine down from the night sky as a variety of nocturnal animals float and skitter their way in and around the moonflowers. When the dawn light emerges, the pollinated moonflowers start to curl up, while new tightly closed buds await the next night. The nighttime creatures return home as the sun comes up, and the moonflowers, now wilted, begin to dry out. In the coming weeks they will spill seeds onto the ground so new plants can sprout and the cycle can begin again.

Informational sidebars accompany the lyrical text on each spread. The sidebar material discusses facts about the plant or animal mentioned on that page in more depth. The story closes with a discussion about the habits of nocturnal animals. The book also includes a simple glossary and directions for planting a moonflower.

Themes

- Flower life cycle
- Pollination and fertilization
- Nocturnal animals
- Continuity of life

Praise for the Book

"The lyrical text describes the nighttime activity surrounding the plant with magical overtones that remain true to nature's nocturnal cycles. Brief information given in the text is supported by facts in vertical sections on one side of the double-page spreads."

— School Library Journal

Before You Read

1. Order seeds before you begin the study of this book. Plant moonflower seeds in individual milk cartons and potting soil following the directions at the back of the book. Morning glory seeds could be substituted if moonflower seeds are unavailable.
2. Ask your students to fill out an anticipation guide **(See insert A)** or make a KWL chart (What I Know, What I Want to Learn, What I Have Learned).
3. Show your listeners the front cover of the book and ask them what they think the book is about. Establish a purpose for reading the book.
4. Show pictures without reading text and have children name all the animals.

As You Read

1. Ask your listeners to write the names of each living thing in a journal as they are introduced in the story.
2. Instruct the students to select a picture that appeals to them and briefly write down what is in that picture. They might want to select two or three and do this. Later, the students can write about that picture or illustrate it from their memory and notes.

After You Read

1. Create a simple 24-hour timeline of the events in THE MOONFLOWER and break it down into sections. (For example: sunset to midnight; midnight to sunrise, sunrise to noon, etc.) Put the timeline on the board. Divide the students into groups and assign each one a section of the night or day to describe and illustrate. Ask them to fill in what they think would be happening during that period. Compile the material from all the groups and make a large timeline poster for display in the classroom. Point out the continuity and renewal of the cycles.

A variation on the above activity: Have students draw individual pictures illustrating the cycle of a typical moonflower's life. Students will then cut out their pictures and paste them to a rectangular piece of paper. Tape both ends of the paper together to create a life cycle wheel. You may hang with string to display. (Each child will need three pieces of yarn and a paperclip at the end of the project to hang.) Punch three holes in the top three areas of the wheel and pull yarn through holes and tie. Meet all three pieces of yarn in the center and tie to paperclip. Hang in classroom.

2. Together, list sensory words or visual images depicted in the book. Write them on the board. Have students suggest more words that express the feelings that the story evokes in them and add them to the list.

3. Use the follow-up thought questions and activities as a class discussion guide or have small groups of students discuss and write answers to them.

Thought Questions

1. Why do you think the moonflower developed to bloom at night?
2. Choose three of the animals from the list you made as you read. Decide which one of the three is the most important to the moonflower and write it at the top of a piece of paper. Choose another one of the three that is least important to the moonflower. Skip one line and write that animal as the third on the list. Then put the other animal in the middle. Tell why you ranked them this way.
3. Explain why flowers need insects.
4. Rewrite this story using the morning glory, a close relation of the moonflower. The morning glory opens during the day instead of at night. Use the same pattern as the book for your story, except set it in the daytime and substitute animals that are active during the day.
5. Make a list of things of things you do each night as it begins to get dark. Compare the idea that the moonflower is beginning its activities and students are ending theirs.
6. Describe the dark.
7. Make up a firefly "code" of your own and write a key corresponding to the letters of the alphabet. You can use numbers or simple symbols for your code. Write your name or a sentence in your code.
8. What are some things that take place in the country or in a big city during the night? Write a paragraph describing a typical night in one of these places.
9. Explain why a seedpod must dry out and why this is important to the flower.
10. Make up another name for the moonflower. What would you call it? Why would you name it that particular new name?

Interdisciplinary Connections

Social Studies

1. Provide a simple outline map of the U.S. Help students find and label your city and state on their maps. (Save the maps for other activities on this list.) Visit the following website to print U.S. maps for classroom activities at no cost.
http://www.enchantedlearning.com/label/usa.shtml

2. The book states that the sun sets in the west. In what direction would you look to see the *rising* sun? Discuss compasses and directions, using an accurate compass, if possible. Talk about the orientation of your classroom or your school. In what direction does it face? Do the windows face the rising or the setting sun? Draw and label a simple compass rose on the board and discuss how maps are oriented. Have students draw a compass rose (with north pointing up) on the maps you

provided in activity 1. Ask more advanced students to make a simple map of the school grounds or their neighborhood. Younger students could draw a picture of the rising or the setting sun.

3. Using students' current knowledge, discuss the climate in your area and list familiar words that describe your local weather and temperature.

4. Look up in an almanac or on the internet your state's average temperatures throughout the year. Discuss the way temperatures vary from place to place and from season to season. Relate the different temperatures to things the students are familiar with, like a snowy day (or the lack of snowy days), a trip to the beach, etc. Ask them what they would do or what they would be wearing in the various situations. Have students illustrate with pictures or write descriptions of the clothing and activities.
http://www.cdc.noaa.gov/USclimate/states.fast.html

5. Look up in an almanac or on the internet the standard state abbreviations. Write the abbreviation for your state and the surrounding states or any combination you choose. If the blank U.S. map you provided in activity 1 has the outlines of the states, students can fill in the abbreviations for each state.
http://www.usps.com/ncsc/lookups/usps_abbreviations.html#states

6. On the internet, look up the plant hardiness zones for the U.S. and identify your state and zone. Use the key to help understand what zone your city and state are in. Discuss the meaning and significance of the temperatures.
http://www.usna.usda.gov/Hardzone/ushzmap.html

7. Draw lines indicating the hardiness zones for your state or the U.S. on the map from activity 1. Label and color the different zones.
http://www.usna.usda.gov/Hardzone/ushzmap.html

Language Arts

1. Enlarge and reproduce the glossary words from the back of the book and distribute to students. Have them cut out the words and definitions separately. Instruct them to match up the words with their definitions and paste them on sheets of paper to create their own picture dictionary. Ask them to illustrate each word.

2. Define fiction and nonfiction using a dictionary. Talk about what makes THE MOONFLOWER a nonfiction book. Ask students to write a simple fictional story based on the information in THE MOONFLOWER.

3. Discuss compound words. Go back through the text and identify the compound words. Define each part of the word, and then discuss how the two parts give meaning to the larger word.

4. Look up the word nocturnal in a dictionary. Compare the definition to the one in the glossary. Ask students to make a list of the nocturnal animals they know. Add the animals from the book. Practice writing sentences using sensory words about the nocturnal animals listed in the book.

5. Have each student choose an animal to research. Use the following steps to prepare for the report.

- ❑ Have students read about the animal. They can look in books, encyclopedias, and on the internet.
- ❑ Ask them to find interesting facts about their animal and write them down on cards or paper. The following suggestions will help them in their research.

- **Name:** Does the name of the animal mean something? What are the babies called? Do the parents have special names? Older students may find the scientific name. (For example, a deer male is a buck, a female deer is a doe, and the young is a fawn. The scientific name for the deer family is in Latin: *Cervidae.)*
- **Appearance:** What does the animal look like? How big or small is it? How much does it weigh? Does it have any interesting body parts? Tell about them. What animals is it related to?
- **Habitat:** Where does your animal live? What biome does it live in? Is it found only in the United States? Can you find it somewhere else in the world?
- **Locomotion:** How does your animal move around? Does it have to escape enemies or use its motion to get food?
- **Offspring:** How many babies does your animal usually have? When and where are the babies born? How long are they in the mother before they are born? Do they come from eggs? How long does it take for them to hatch? What can the babies do after they are born? Can they move around or do they need the parents to help them?
- **Diet:** What does your animal eat? Is it a carnivore, herbivore, or omnivore? Where is your animal in the food chain?
- **Habits:** Tell about interesting things your animal does. Does it live alone or in groups? Does it have a special way of getting food or

getting away from enemies? What is its usual behavior?

- **Any interesting facts:** Is there something about your animal that makes it special? Does it do something most animals do not do? Does it have special adaptations that make it different from most other animals? Does it do anything that seems strange to you?

  - Have students use the ideas above and their notes to write a report on an animal or insect from the story. They should begin with an introduction telling about their animal in general. Then make a paragraph for each main circle on their prewriting graphic.
  - Ask them to list the names of the books, encyclopedias, and internet sites they used.
  - Have them draw a picture of their animal.

3. Read the story and direct the students to listen carefully because they will be rewriting the story after you finish reading it. (You will want to read only the narrative text and skip the information included in the sidebars for this activity.) Then have the students retell it in writing on their own paper. Ask them to put this version aside for later. After students have completed the vocabulary activity **(Insert B)**, reread the story and have students rewrite it again in their own words. Compare the two versions. Discuss the differences. Ask why the second version might be better.

7. Write a poem about a moonflower or another flower. Make a flower card and include their original poem inside it.

8. Divide students into ten groups. Assign each group a sidebar of information from the book. Ask each group to write a riddle about the organism described in the sidebar. Make a game of having one group read their riddle and allowing the other groups to guess the answer. (You may want to omit the nocturnal sidebar at the end unless you have exceptionally creative students.)
Example:
I use radar to move.
I have large ears.
I make high-pitched squeaks.
What am I? *(Answer: bat, p. 7)*

9. Ask students to find a poem about flowers or the moon at the library. Have a recital day. Ask each student why he/she chose that particular poem to learn?

10. Help the class write similes using the living things from the book. Have the students make up their own comparisons.
Example:
Her face was as white as a moonflower.
The boy jumped as quick as a cricket.

11. Have students look up information about bats. What do they eat? Why are so many people afraid of bats? Create a book in the shape of a bat and include information and several pictures.

Vocabulary Activity

1. After you have read the book, say the words on the following list aloud. Give the list to the students and discuss the meaning of each word. Divide the class into pairs. Tell the students to try to remember how to say the words on the list. Encourage them to figure out the pronunciation using what they know about letter sounds. Have the students practice reading the words to each other. Write the words out of order and have students list them in alphabetical order. (These words are from the main text and not the sidebars.)

bicycles	fragrance	sparklers
blossoms	glide	swoops
buzzes	glow	trumpets
curls	perfume	twining
delight	shrubbery	unfurl
flashing	silvery	whir
flicker		

Science and Math

1. Discuss the following vocabulary. Label a diagram of a flower using a simple picture depicting flower parts. Draw a moonflower next to the diagram.

stamen—the thin male part inside the flower.

pistil—the thin female part inside the flower.

anther—the end tip of the flower's stamen (the male part) that has the pollen.

filament—the thin part that holds the anther.

ovary—the bottom of the pistil (female part) where the ovules (first seeds) are grown.

petal—the brightly colored flower part that is around the stamen and pistil.

sepal—little leaves right under the colored flower. They are really part of the flower and not true leaves.

stem—the stalk that holds up the flower.

peduncle—the thick, rounded top of the stem.

stigma—the top part of the pistil where the pollen grains must land to make a seed.

style—the tubelike middle part of the pistil. This is where the pollen moves down to the ovule.

2. At the appropriate time of year, collect a cricket. Be careful not to injure it. Provide some grass for hiding and make sure there is a sufficient air supply. Ask students to listen to the cricket chirp and calculate the temperature in the room using the formula from the book (page 4). Release the cricket immediately following this activity.

3. Ask students to look up the life cycle of the moth. Draw and label the different stages.
Compare and contrast the moth life cycle with the seed formation of a flower. Write the differences on a T-chart.

4. Ask students to bring in different kinds of seeds. Have them make labels for each seed with the plant name and collector. Create a display of the seeds.

5. Discuss the term Fahrenheit. Plot the Fahrenheit scale from 0 to 250 on a graph. Demonstrate how to use even increments when making a graph. Identify freezing (32 degrees) and boiling (212 degrees). Then plot a centigrade thermometer and compare the two.
(Boiling = 100° C and freezing = 0° C.)

6. Ask students to look up information about the nighthawk. Try to find other birds that are closely related to it. Write their names and report back to the class.

7. Soak thirty bean seeds in water overnight. Lima beans are best because of their size. Split apart the beans and locate the baby plant inside. Identify the leaves, the stems (cotyledons), and the food source for the baby plant (the seed). Ask students to draw the dissected seed and label their observations.

8. Research the phases of the moon. Have students make a poster or chart showing each phase and label the names of the phases.

9. Look up how tall moonflowers grow (average is around 15 feet but they can get up to 70 feet in height.) Measure a length of string and cut it off at 15 feet. Stretch out the string and brainstorm ideas about what is taller or wider than 15 feet. Use the string to compare this length with common objects and lengths around the room and school and write simple equations showing this comparison.

Example: 15 feet = 18 lockers
15 feet = 24 students in line

10. Report on an insect's proboscis, antennae, or compound eyes and how they help the insect. Look for ways each is adapted to its job.

11. Collect examples of wildflowers. Press them in old telephone books. Label as many as possible.

12. Set up an experiment called *"What Kind of Soil do Seeds Need?"* Use dirt from the schoolyard, sand, a container of water, and gravel in each of four pots. Give equal amounts of water as needed and plant 3 seeds in each pot. Have students predict what will happen to the seeds in each pot and record it in a science journal or on a piece of paper. Have students consider the following points when organizing information for experiment:

Title of Experiment: (You name it.)
Question you are asking: (What are you trying to find out?)
Prediction: (Tell what you think will happen.)
Materials: (List what you need to do the experiment.)
Observations:
Qualitative (What you can tell using your senses.)
Quantitative (What you can measure using numbers.)
Results: (What actually happened?)
Conclusion: (What did you find out or learn?)
Watch and record results daily.

A MEMORY HELPER:
Quantitative observations are ones that use numbers and can be measured. Qualitative observations are those that include color, descriptions, or adjectives.

N is for numbers = quaNitative
L is for letters = quaLitative.

Follow up this experiment with another one. After the class has decided on the best medium for planting, have the students plant several seeds of their own. Bean seeds work well. Water and observe daily. As the plants germinate, keep data on the height of each plant. Make a class graph. Discuss reasons for differences in size.

13. Ask students to research the moonflower. Where does it live most commonly? What disease problems does it have? What other plants is it related to? Will the juvenile plants look the same as the parent plant?

14. Have students look up the word pollination. Try to find at least three ways pollen gets from flower to flower.

Art

1. Show students how to make a construction-paper card to go with their moonflower poems. To create the vines and tendrils, twist green crepe paper; use white tissue paper for the blossoms.

2. Have students make a pop-up vase card filled with flowers. You can see an example from this website.
http://www.enchantedlearning.com/crafts/popupcards/flowervase/

RESOURCES Internet sites of interest:

http://www.moonlightsys.com/themoon/flower.html
-Video page of moonflower opening

http://www.usna.usda.gov/Hardzone/ushzmap.html
-U.S. National Arboretum

http://www.usna.usda.gov/Hardzone/ushzmap.html
-Plant hardiness zone map

http://www.burpee.com --Burpee seed catalog

http://www.usps.com/ncsc/lookups/usps_abbreviations.html#states --state abbreviations

http://www.cdc.noaa.gov/USclimate/states.fast.html
-climate and temperatures

Notes:

Husband and wife PETER and JEAN LOEWER are writers and illustrators who deal with the natural world. The Loewers have collaborated on two other children's books: *Pond Water Zoo* and *The Inside-Out Stomach*. The Loewers have lived and worked in New York City, upstate New York, and now in Asheville, North Carolina.

ABOUT THE AUTHOR

PETER LOEWER earned a Max Beckmann fellowship to attend Brooklyn Art School, where he went on to receive his Bachelor of Fine Arts in graphics. He has written eighteen books on gardening and has authored dozens of magazine and newspaper articles on the subject. He also serves on the editorial advisory board of The American Horticultural Society.

ABOUT THE ILLUSTRATOR

JEAN LOEWER received her Bachelor of Fine Arts in painting as well as her certificate in art education from Hunter College in New York City. She has illustrated 10 children's books, taught art in public schools as well as adult education classes, and now works as a children's librarian.

We have authors and illustrators who visit schools and libraries! For information regarding author appearances, please contact our Marketing Department at 404.876.8761 x111 or hello@peachtree-online.com.

Peachtree Pointers for THE MOONFLOWER was prepared by Shirley Smith Duke

Peachtree Pointers order no. ISBN: 1-56145-356-0-TG.

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Updated 1.12.06

Insert A

efore reading *The Moonflower*, answer the questions on the Anticipation Guide. hen read through *The Moonflower* and answer these questions again to see if our first response was correct. Fill in the area below each question with any dditional information about that point you find of interest.

Anticipation Guide

1. Moonflowers bloom at night.	yes / no
2. A hawkmoth's tongue is as long as its body.	yes / no
3. Bumblebees cannot see at night by the light of the moon.	yes / no
4. Bats see in the dark with their eyes.	yes / no
5. Moths have noses.	yes / no
6. Insects always know they are carrying pollen.	yes / no
7. Fireflies communicate with their flashes.	yes / no
8. You can tell the temperature using cricket chirps.	yes / no
9. A moth can still fly if it loses its antennae.	yes / no
10. Seeds don't grow if the flower part falls off.	yes / no

Insert B

Vocabulary Words

abdomen	Fahrenheit	mourning dove	proboscis
antennae	germinate	nighthawk	robin
bat	hawkmoth	nocturnal	stamen
bumblebee	Milky Way	owl	tendril
compound eye	mockingbird	pistil	wing-cover
cricket	moonflower	pollen	

Vocabulary / Definitions

1) To develop and grow.

_____

2) A climbing vine in the morning glory family with heart-shaped leaves.

_____

3) A large black insect with yellow markings that makes a pleasant buzzing sound as it flies.

_____

4) A slim-winged gray-brown bird that is active at night..

_____

5) A threadlike part of a climbing plant that is used for support.

_____

6) A common insect that is often found outside on summer nights with a soft, high-pitched song.

_____

7) A gray-brown bird with a small head and a long pointed tail.

_____

8) The galaxy that includes our sun and earth.

_____

9) Active at night.

_____

10) The hindmost section of an insect's body

_____

11) The common measure of temperature in the United States.

_____

12) Flexible, feeler-like projections on the head of an insect, such as the hawkmoth.

_____

13) A medium-sized gray and white bird with a slender, down-curved beak.

_____

14) A nocturnal winged animal with a mouse-like, fur-covered body. At rest, it hangs upside down.

_____

15) The male part of the flower, which is made of a sac at the end of a stalk.

_____

16) Fine, powdery, usually yellow grains produced by the male part of the flower.

_____

17) The female part of a flower that contains the ovules, or future seeds.

_____

18) A nocturnal bird with large eyes and with plumage so soft it can fly without a sound.

_____

19) The front pair of wings in many insects that have developed into covers, usually very colored.

_____

20) A common red-breasted thrush who is often seen walking about looking for worms on lawns.

_____

21) A sight organ made of up many single eyes crowded close together.

_____

22) A hairy, medium-to-large moth with a long proboscis.

_____

23) The long, slender mouthpart of an insect, used like a soda straw to move food into the insect.

_____

ANSWER KEY: **for Insert B Vocabulary / Definitions**

. To develop and grow. / **GERMINATE**
. A climbing vine in the morning glory family with heart-shaped leaves. / **MOONFLOWER**
. A large black insect with yellow markings that makes a pleasant buzzing sound as it flies. / **BUMBLEBEE**
. A slim-winged gray-brown bird that is active at night. / **NIGHTHAWK**
. A threadlike part of a climbing plant that is used for support. / **TENDRIL**
.A common insect that is often found outside on summer nights with a soft, high-pitched song. / **CRICKET**
. A gray-brown bird with a small head and a long pointed tail. / **MOURNING DOVE**
. The galaxy that includes our sun and earth. / **MILKY WAY**
. Active at night. / **NOCTURNAL**
0. The hindmost section of an insect's body. / **ABDOMEN**
1. The common measure of temperature in the United States. / **FAHRENHEIT**
2. Flexible, feeler-like projections on the head of an insect, such as the hawkmoth. / **ANTENNAE**
3. A medium-sized gray and white bird with a slender, down-curved beak. / **MOCKINGBIRD**
4. A nocturnal winged animal with a mouse-like, fur-covered body. At rest, it hangs upside down. / **BAT**
5. The male part of the flower which is made of a sac at the end of a stalk. / **STAMEN**
6. Fine, powdery, usually yellow grains produced by the male part of the flower. / **POLLEN**
7.The female part of a flower that contains the ovules, or future seeds. / **PISTIL**
8. A nocturnal bird with large eyes and with plumage so soft it can fly without a sound. / **OWL**
9. The front pair of wings in many insects that have developed into covers, usually very colored. / **WING-COVER**
0.A common red-breasted thrush often seen walking about looking for worms on lawns./ **ROBIN**
1. A sight organ made of up many single eyes crowded close together. / **COMPOUND EYE**
2. A hairy, medium-to-large moth with a long proboscis. / **HAWKMOTH**
3. The long, slender mouthpart of an insect, used like a soda straw to move food into the insect. / **PROBOSCIS**

Notes: