# Lesson Plans for 2011-12 School Year

**Grade 4**

## Maintaining a Healthy Garden

**Lesson nine:** What do butterflies and other flying insects have to do with producing food?

“A Butterfly’s Life” from GROWING IN THE GARDEN, Iowa State University Extension and Outreach

The students review the butterfly’s life cycle, including how they help to pollinate plants. Students discover plant and animal interdependence. They study what to plant to attract butterflies.

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<th>Content objectives:</th>
<th>Name and describe the four stages in the complete life cycle of butterflies; Explain and give evidence of plant and animal interdependence; Review and demonstrate the process and sequence of plant pollination.</th>
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<td>Life skill objectives:</td>
<td>Learning by modeling, Observing, Critical thinking, Communication, Citizenship if using Optional Activity of planting a butterfly garden for others to enjoy</td>
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### Core and STEM concepts and skills:

- **Science:** Life (characteristics of organisms, life cycles)
- **Math:** Number and operation, Measurement, Data analysis, Connections, Representations
- **Language Arts:** Factual understanding, Summarizing, Sequencing, Interpreting, Inferring, Vocabulary, Speaking

### Healthy snack:
Select items to sample that have flowers before the item grows, such as tree fruits, beans, peas or tomatoes

### Additional and supporting resources:
1) Check with local beekeeper associations for possible classroom presentation on bees as pollinators. 2) “Buzzy, Buzzy Bee” from FOOD, LAND & PEOPLE: RESOURCES FOR LEARNING, Food, Land & People, available for $4.00 digital download from [http://www.foodlandpeople.org/ordering/gardenwise/](http://www.foodlandpeople.org/ordering/gardenwise/) (for Grade Level: 2-7; Students play a game in which they pretend to be honeybees and apple trees. In the process, they learn about plant pollination).
BEFORE THE LESSON

1. **Grade 4, Lesson 9**: This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the [www.peoplesgarden.wsu.edu](http://www.peoplesgarden.wsu.edu) Educational Toolkit.
2. Check with your library for a copy of *Caterpillars and Butterflies (Beginners Nature, Level 1)* 2007 by Stephanie Turnbull (Author), Rosanne Guille (Illustrator), Uwe Mayer (Illustrator).
3. Prepare tree fruit, beans, peas or tomatoes for taste testing.

THE LESSON

*A Butterflies Life* is a lesson that should be taught over several days.

AFTER THE LESSON

1. Several optional activities are included at the end of the lesson. Consider inviting local beekeepers to give a presentation about pollinators.
2. Continue your garden journals or records. Each time you do a lesson or go out in the garden, there is an opportunity to add something new to the Garden Journal.
A Butterfly’s Life

CONTENT OBJECTIVES
Name and describe the four stages in the complete life cycle of butterflies. Explain and give evidence of plant and animal interdependence.

LIFE SKILL OBJECTIVES
Learning to learn by modeling, observing and planting; Critical thinking; Communication through creating visuals, asking questions, and talking in small and large groups; Citizenship if using the Optional Activity of planting a butterfly garden for others to enjoy.

INDICATORS
Build and use models that demonstrate the four stages in a butterfly’s life cycle. Complete the Butterfly Secret Code activity sheet, Identify evidence of plant and animal interdependence on a garden plan, Define vocabulary words, Successfully plant and grow a plant that butterflies like.

EVALUATIONS

SUBJECT STANDARDS
Science: Life (characteristics of organisms, life cycle of organisms, organisms and environments)
Language Arts: Factual understanding, Summarizing, Sequencing, Interpreting, Inferring, Vocabulary, Speaking in small and large groups
Math: Number and operations, Measurement, Data analysis, Connections, Representations

LEARNER TYPES
Linguistic-words, Spatial-visual, Logical-mathematical, Music, Intrapersonal, Interpersonal, Natural

MATERIALS
8½” x 11” sheets of white paper for painting or coloring (one sheet per student, see the Introduction section)
Finger paints, tempera paint, or markers or crayons (enough to share between students, see the Introduction section)
Pencils (one per student)
Scissors (one per student)
Caterpillars and Butterflies by Stephanie Turnbull (Usborne Beginners)
8½” x 11” sheets of white paper cut into eighths or small Post-it® notes (one per student, see the Do section)
Many colors of pipe cleaners (cut in half; one per student)
Empty toilet paper or paper towel rolls cut into thirds (one per student)
“Birth of a Butterfly” lyrics (enlarge and copy on a transparency or write the words on the board, see the Reflect section)
MATERIALS LIST continued on next page
MATERIALS

7 - 5" x 7" cards or regular sheets of paper (write "butterfly," "cone flower," "milkweed," "pollination," "pollen," "host plant," and "nectar" on them; see the Reflect section)

Tape

Butterfly Secret Code (one set per person, found on two pages at the end of this lesson)

Butterfly Garden plan (make one transparency, found at the end of this lesson)

Zinnia seeds

12" x 4" strips of black and white newspaper (at least one per person)

4 or 5 empty frozen juice cans

Fresh potting soil

Garden flat or tray

Large, clear plastic dry cleaner’s bag

3" x 5" cards or quarter sheets of paper for “Vitalize Your Vocabulary” (see in the Apply section)

INTRODUCTION

ENGAGE

SET THE STAGE

15 MINUTES, POSSIBLY 1 DAY BEFORE THE DO/EXPLORE ACTIVITIES

A CLASSROOM OF BUTTERFLIES

Set out the paints, brushes (or use fingers), cups of water (or use markers and crayons instead of paint), paper, pencils, and scissors, and proceed with the following instructions. Read through the instructions before you begin. Try making an example for your class or enlarge the graphics to show where the students are heading if they follow the instructions. You may want to do this activity the day before you go to the Do/Explore section to let the paint dry on the butterflies.

What is the most colorful, delicate-looking insect you can think of?

A butterfly is the most popular answer.

We are going to make butterflies. Listen to the following instructions to create your own personalized butterfly.

1. Fold your paper in half lengthwise so you have two long halves of paper. Each half will eventually be a butterfly wing.

2. (If you are using markers and crayons instead of paint, skip this step and color your butterfly wings after cutting them out.) Unfold your paper. On one half of your paper, finger paint or use brushes to make colorful splashes or designs. Remember, the more water you use, the lighter the color and the wetter the paper. Clean your brushes between colors. If you want to blend colors, blend them on the paper, but too many colors together make a dull brown. Try not to brush or rub the paper too hard or you’ll make a hole. When you are done, fold the paper in half to transfer your colors and patterns to the other butterfly wing. Butterflies have the same color and patterns on the top of each wing, like a mirror image.

3. Put the folded paper on the floor. Carefully place one of your stocking or bare feet on the paper, lining up the inner or outer edge of your foot with the fold line. Your foot will determine the shape of the butterfly’s wings. Try not to move your foot around on the paper. Trace around your foot with a pencil.

4. Cut around the outer shape of your foot but DON’T cut the side of your foot along the fold line because that will be the body of your butterfly holding the two wings together.

5. Unfold your butterfly and let the wings dry. If you are using markers or crayons, color the top sides of the butterfly wings so the wings look the same.
How has your foot changed since you were a baby?
It has changed in size, but it still has the same parts.

How has your body changed since you were a baby?
Our bodies change in size, amount of hair, and what you can do with your muscles. We still have the same body parts and basic appearance.

How are the changes in your body throughout your life different than the changes in the life cycle of a butterfly?
We basically stay the same and a butterfly completely changes appearance from an egg, to a caterpillar, to a chrysalis, and then to a butterfly. Although people and butterflies both depend on plants for food, we basically eat the same kinds of foods from plants and animals throughout our life. When a butterfly is a caterpillar, it eats plant leaves and twigs; when it is a butterfly, it sips nectar from flowers.

Butterflies have what is called a complete life cycle. That means they go through major changes from an egg to a butterfly. The change from an egg to an adult butterfly is called complete metamorphosis. Maybe you have heard the word metamorphosis on some cartoons where something changes its looks into something else completely different. Metamorphosis is a real process during a butterfly’s life cycle.

We are going to have fun learning about complete metamorphosis in the life cycle of butterflies. We are also going to find out how butterflies and plants need each other.

**MAKING BUTTERFLY LIFE CYCLE MODELS**

1. Read pages 3-5 and look at the pictures in Caterpillars and Butterflies by Stephanie Turnbull. Distribute the eighth sheets of paper or Post-it® notes, one per student. Have the students draw and color butterfly eggs. The eggs will be much larger than real butterfly eggs. Have them put the eggs in front of them on their desks. Then continue with the question and reading.
   
   **What hatches out of the egg?**
   
   A caterpillar

2. Continue reading pages 6-13 in Caterpillars and Butterflies.
   
   Distribute one half of a colorful pipe cleaner to each student. Have them coil it around their finger to make a caterpillar. Have them put their caterpillars next to their eggs.

3. Continue reading pages 14-17 in Caterpillars and Butterflies.
   
   Pass out the empty paper rolls. Have the students color them with crayons or markers to resemble a chrysalis.

4. Continue reading pages 18-29 in Caterpillars and Butterflies.

   **How many wings do butterflies have?**
   
   Four
How are moths different from butterflies?
Most moths fly at night, not during the day like butterflies. Moths typically have fatter, furrier bodies and feathery antennae rather than thin, club-shaped antennae on butterflies.

Using a marker or crayon, the students can outline the two sets of wings, or four wings, on their butterflies. They can turn them over and color the back side with crayons (so it doesn’t show through on the front side.) Mark the two sets of wings so they match fairly closely to the watercolor wings. When they are finished with their butterflies, have them line up their eggs, caterpillars, chrysalises, and butterflies in the correct order on their desks.

Write on the board the lyrics to the “Birth of a Butterfly” song found in this section. You may choose to enlarge the lyrics and copy them on a transparency.

**BUTTERFLY LIFE CYCLE FINGER PUPPET PLAY**

How many stages are in a butterfly’s life cycle?
Four

What is the term used to describe the changes in a butterfly’s life cycle from egg to butterfly?
Complete metamorphosis

Use the models you just made to learn about the four stages in a butterfly’s life cycle in the song “Birth of a Butterfly.” We’ll learn and act out the words slowly the first time through. Then we will sing and act out the song. *(The lyrics to the song are written below. The instructions for acting out each verse are written beside each verse starting on the next page. The discussion questions are written after each verse. The responses to the questions are found in the book Caterpillars and Butterflies by Stephanie Turnbull, which was read in the Do/Explore section.)*

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**BIRTH OF A BUTTERFLY**

*Words from 101 Science Poems and Songs for Young Learners*  
*by Meish Goldish and sung to the tune of “Hush Little Baby”*

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A mama butterfly lays all her eggs,  
Out pops a caterpillar, crawling on its legs.

The caterpillar first is rather thin,  
But then it eats till it bursts through its skin.

After growing nice and big,  
The caterpillar climbs on a leaf or twig.

It makes a shell where it hangs inside.  
The shell then cracks and the parts divide.

Inside the shell, a change was going on,  
The form of the caterpillar now is gone.

When the shell opens, what comes out?  
A beautiful butterfly fluttering about!
BIRTH OF A BUTTERFLY

Words from 101 Science Poems and Songs for Young Learners
by Meish Goldish and sung to the tune of “Hush Little Baby”

VERSE ONE

A mama butterfly lays all her eggs.

Fly your butterfly to your desk. Pretend she lays her eggs. Have her fly away. Roll the butterfly up and put it in the tube chrysalis.

Out pops a caterpillar, crawling on its legs.

Make your caterpillar look like it comes from an egg.

Where do butterflies lay their eggs?
On leaves and twigs

What do butterfly eggs look like?
(You may want to show the pictures on page 5.) They can be round, long and thin, or attached like a string of beads. They can be rough or smooth. They come in all sorts of colors and patterns. Hold up the eggs you made so we can all see how different they are.

How long does it take for a caterpillar to hatch from its egg?
Five to 10 days

How many legs does a caterpillar have?
(You may want to show the pictures on pages 8 and 9 in Caterpillars and Butterflies by Stephanie Turnbull.) A caterpillar has sixteen legs.

What do the legs do?
The front legs help them grab their food and the back legs are suction cups that grip onto surfaces to help the caterpillar move and cling to things.

VERSE TWO

The caterpillar first is rather thin,

Gently pull the pipe cleaner caterpillar to make it look thin.

But then it eats till it bursts through its skin.

Pretend that the caterpillar is eating leaves or the paper with the pictures of eggs on it.

Why do you think butterflies lay their eggs on leaves and twigs of plants?
When the caterpillar comes out of the egg, it has something (leaves) to eat. The plant that provides the food for the caterpillar right after it hatches from the egg is called a host plant.

How many times do most caterpillars change their skins?
Four times

Is their new skin the same pattern as the previous one?
No, the patterns change and become more complex.

Continued on next page.
VERSE THREE

After growing nice and big, | Squeeze the pipe cleaner caterpillar together to make it wider and pretend it's eating.

The caterpillar climbs on a leaf or twig. | Move the caterpillar to a pretend leaf or twig.

What are some things that caterpillars do to keep their enemies away?
They are camouflaged, taste bad, have “eye spots,” etc. (You may want to show the pictures on pages 10 and 11 in Caterpillars and Butterflies.)

How long do you think a butterfly is in a caterpillar stage?
It depends on the type of butterfly – it can be a week to 2 months or more.

VERSE FOUR

It makes a shell where it hangs inside | Put the caterpillar in the tube chrysalis.

The shell then cracks and the parts divide. | Pretend the tube is cracking but don’t break it; we will need to use it again.

What are the first two stages of the butterfly life cycle so far?
Egg and caterpillar

What is the third stage called?
Pupa (pupae is plural); the pupa is inside the hard shell or casing.

What is the hard shell or casing called?
The hard casing is called a chrysalis. You may have heard the term cocoon. A cocoon is a softer, silky casing that protects a moth pupa.

What is the hard shell or case made out of?
The caterpillar’s skin

VERSE FIVE

Inside the shell, a change was going on,

The form of the caterpillar now is gone. | Take the caterpillar out and put it aside.

How long is the pupa stage?
It may take a few weeks or several months before the pupa changes into an adult butterfly and breaks out of the chrysalis.

VERSE SIX

When the shell opens, what comes out?

A beautiful butterfly fluttering about. | Remove the butterfly carefully from the chrysalis, unroll it, and hold it so that the wings can flutter and fly above you and your desktop.
Are a butterfly’s wings wet or dry when they come out of a chrysalis?
Wet

Were your paper butterfly wings wet or dry when you first painted them?
Wet

Why do a real butterfly’s wings and your paper butterfly’s wings need to dry before the butterfly can fly?
The wings become lighter in weight and stiffer so they fly easier.

What natural resource helps to dry a butterfly’s wings?
The sun

How many wings do butterflies have?
Four or two sets on each side of their bodies

What do butterfly wings and fish have in common that help them to fly and to swim?
They both have scales. (You may want to look at the microscopic picture of butterfly scales on page 19 of Caterpillars and Butterflies.)

Do all butterflies live their entire lives near where they were born?
No.

What do you call the flight where some birds and butterflies fly thousands of miles to a warmer climate?
Migration

What is the name of a popular orange and black butterfly that flies more than 1,000 miles from Midwest states such as Iowa to Mexico when the days get shorter in the fall?
Monarchs

Raise your hand if you have seen a monarch.
Take your butterflies and fly or migrate to another part of the room.

Give them a minute to migrate and then come back to their desks. Talk about what it would be like for a butterfly to migrate. Later, you may want to contact your county conservation office to see if someone can help you tag butterflies to track their migration.

After you’ve run a long distance or played hard, besides resting your muscles, what else do you want or need?
You probably want something to drink, especially water. An energizing snack renews your energy, too.

Do you think butterflies drink water and have snacks?
Yes, butterflies need water to drink.

What do butterflies like to eat?
They like nectar from flowers. Butterflies have a proboscis, which is like a tiny straw. When the butterfly lands on a flower, it unfolds its proboscis and puts it deep into several different places near the center of the flower to sip up the sweet liquid called nectar. (You may want to show the pictures of a butterfly sipping nectar with its proboscis on pages 22 and 23 in Caterpillars and Butterflies.)

While the butterflies are getting nectar, what else is the butterfly doing to help the plant?
Butterflies get powder-like pollen stuck to their bodies and legs when they visit flowers. They carry the pollen to other flowers, where they leave some and pick up more. The exchange of pollen helps to pollinate flowers. Pollination is necessary for fruits and seeds to develop. (In another session, you may want to do the pollination activity found in Optional Activity Ideas at the end of this lesson.)
Now, using your models, do the motions to the song as you read or sing the words to the tune of “Hush Little Baby.”

You may want to do this a couple times and watch the students. Check if they are using the correct model in the correct way to correspond with the words in the song.

PLANT AND ANIMAL INTERDEPENDENCE

Write the words “butterfly,” “coneflower,” “milkweed,” “pollination,” “pollen,” “host plant,” and “nectar” on cards or sheets of paper. Have students volunteer to be a butterfly, milkweed plant or purple coneflower plant. Tape the appropriate card or paper to their shirts. Give the “pollination” card or paper to the butterfly, the “host plant” card or paper to the milkweed, and the “pollen” and “nectar” cards or papers to the coneflower.

Each of our characters has a card or paper with a vocabulary word on it. That word is something that they give or do for the other. Characters hold up your cards for the rest of the class to see.

Coneflowers have pollen and nectar in their flowers.

Who does the coneflower plant give his/her nectar and pollen cards to?
The butterfly
Why?
The butterfly depends on the coneflower for its food, which is nectar. The coneflower depends on the butterfly to take its pollen to other coneflowers so it can produce seeds. The butterfly lands on the coneflower, unrolls its proboscis and sucks the nectar from deep inside the flower. At the same time, pollen from the flower rubs off on the butterfly’s body.

Who does the butterfly give his or her pollination card to?
The coneflower plant
Why?
The coneflower plant depends on insects such as butterflies to transfer pollen from plant to plant so that pollination can take place and the plants can produce fruits and seeds. The same thing can happen with the milkweed plants.

Who does the milkweed plant give his/her host plant card to?
The butterfly
Why?
The milkweed is where the butterfly lays its eggs. When the eggs hatch, the caterpillars can eat the milkweed leaves.

Do butterflies need plants?
Yes.
What for?
A place to lay their eggs, food for caterpillars, sometimes a place for a chrysalis to cling to, and food in the form of nectar for flowers.
Do plants need butterflies?
Yes.
What for?
Pollination

In every ecosystem or biome, organisms rely on each other in unique relationships that ensure each other’s survival. All living things have basic needs and depend on other living things to meet those needs. We call this “interdependence.” This is one example of “plant and animal interdependence.”

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**BUTTERFLY SECRET CODE**

_Distribute the Butterfly Secret Code and have the students take a look at the picture. Start with the following discussion before coloring the picture and unlocking the secret code._

**What kind of butterfly is sitting on the flower?**
A monarch
Monarchs can be seen in many parts of the country, particularly in the late summer and early fall.

**What color is a monarch butterfly?**
Orange and black

**What is the name of the flower in the picture?**
The monarch on our activity sheet is sitting on a coneflower. Butterflies are attracted to flowers that have bright pink or purple blossoms such as those on a coneflower. Purple coneflowers, zinnias and cosmos are good garden plants for attracting butterflies because of their colors and because they have flat tops where butterflies can land. They also like plants with lots of little flowers.

**What is the other plant in the picture called?**
Milkweed

_Raise your hand if you have seen milkweed plants growing in ditches or other wild areas._
Milkweed plants have big green leaves with gray pods. The flowers are typically pink, orange or yellow, depending on the type of milkweed.

Monarch butterflies lay their eggs only on milkweed plants – no other type of plant. The milkweed is the _host plant_ because the leaves provide the food for the caterpillars that emerge from the eggs. Point to the monarch eggs in the picture.

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**BREAKING THE BUTTERFLY SECRET CODE**

Now, it’s your turn to figure out the Butterfly Secret Code. Use the code in the picture and what you already know to finish the sentences about butterflies. When you are finished, color the picture with the same colors that monarchs, coneflowers and milkweeds are in our gardens and ditches.
Because the students have already learned about the information on this evaluation tool, they should be able to fill in the blanks without even breaking the entire code for each word. If they need a hint, they may want to find the same number/letter for all the lines. For example, number 19 is for the letter “s.” They can put the letter “s” above all the 19s. After they finish the sentences and color the picture, have them put their names on the activity sheets and hand them in. When you’ve checked them, return them to the students and go over the questions.

PLANNING AND PLANTING A BUTTERFLY GARDEN

Show the overhead transparency of the Butterfly Garden Plan found at the end of this lesson.

This is an example of a butterfly garden plan.

Where should the butterfly garden be located?
Sun or shade?
Sun
Should it be in a windy or protected location?
Protected from the wind so the butterflies aren’t blown around
Where might you enjoy a butterfly garden?
Home, school, public garden, neighbor’s garden, friend or relative’s garden, etc. Notice the path through the middle of the garden for people to use while working in and enjoying the garden.

This Butterfly Garden Plan looks like a graph.

What do the coordinates or numbers across the bottom line or axis represent?
Number of feet of garden space

How wide is this butterfly garden?
10 feet (You may want to measure 10 feet in your classroom and tape it off with masking tape.)

What do the coordinates or numbers up the left line or axis represent?
Number of feet of garden space

How long is this butterfly garden?
15 feet (You may want to use masking tape and tape off 15 feet in your classroom. This will look like the sides of the graph or garden plan.)

Each square in the garden plan represents 1 square foot and the drawings and illustrations show what to plant and where to plant it. Let’s look at the special characteristics of this garden so it will attract butterflies.

1. What brightly colored flowers with a landing pad attract butterflies at coordinate 9, 1?
   Purple coneflowers (You may want to color it purple.)

2. What flower has bright yellow clusters of flowers that butterflies like at coordinate 5, 13?
   Yarrow (You may want to color it yellow.)
3. What are the coordinates for a pie pan to hold the water for the butterflies and rocks to dry their wings?
   1, 4 and 5

4. What is the name of the host plant where black swallowtails like to lay their eggs so that the caterpillars have something to eat?
   Parsley
   What are its coordinates?
   1, 3

5. Where would you plant brightly colored zinnias with landing pads?
   Between coordinates 1-3 and 12-15

We are going to start zinnias that we can plant outdoors to attract butterflies to our home or schoolyard. Zinnia flower heads are composed of many tiny flowers that form a round, flat surface for the butterflies to land and sip nectar. Let’s read the information on the seed package to learn more about zinnias.

Follow the paper pots instructions below or decorate cups for Mother’s Day or another special event.

**MAKING PAPER POTS**

Wrap a strip of newspaper around a juice can with about 1½ inches hanging over the bottom of the can. Fold the excess paper up around the bottom of the can to form the bottom of the pot. Press it down on the tabletop to secure. Remove the juice can. Fold over the top of the pot 1 inch to the inside to hold the pot together and form a rim.

Fill the paper pots with potting soil.

Make a depression in the center of the pot and plant a flower seed. Cover it with ½ inch of soil.

Water gently.

Place pots close together on the tray or flat.

Cover with large, clear plastic bag.

Set in a location that receives bright, indirect light.

When the seeds start to germinate, remove the plastic bag.

Set the plants where they will receive full sunlight.

*(If you feel the paper pots are too difficult to make, you may want to substitute peat pots.)*

When the plants are at least 2 inches tall, you can plant the entire pot in the soil outside. Be sure that the paper is all underground so that it doesn’t act as a wick to take the water away from the plant. The paper will decompose into the soil.
VITALIZE YOUR VOCABULARY

Write the following vocabulary words on pieces of paper or 3" x 5" cards. Place them on a table with the word side down. Divide the room into four or five groups. Explain to the groups of students that this game is called Vitalize Your Vocabulary and the words on the table come from the butterfly lesson. Have group members take turns being butterflies. One butterfly from each group flies to the table and selects one word to take back to where it lives with the rest of its group. His/her group has three minutes to write the word and definition on the back of the card. Someone from each group reads the word and definition to the rest of the class. Everyone decides if the definition is accurate or not. If the definition is accurate, you may choose to give team points.

Pollination  Host plant  Nectar
Monarch     Chrysalis    Complete life cycle
Egg         Caterpillar  Pupa
Cocoon      Migration   Pollen
Butterfly   Moth        Proboscis
Sun         Water       Milkweed
Complete metamorphosis  Plant and animal interdependence

What other creatures go through complete metamorphosis during their life cycles?
Frogs and toads, flies
OPTIONAL ACTIVITY IDEAS

PLANT A BUTTERFLY GARDEN

Use the Plant a Butterfly Garden lesson found in the Growing in the Garden Outdoor Classrooms unit to plan and plant a butterfly garden in a place where everyone can observe and enjoy.

A CLOSER LOOK AT POLLINATION

The following activity is from Growing in the Garden: Outdoor Classrooms for Young Gardeners, Leader’s Guide. You can make the bees or turn the bee wings into butterfly wings cut from colorful napkins. After the flower and insect puppets are made, have the students stand up and put their insects on a finger of their right hands and hold their flowers in their left hands. Next, the students buzz their bee or fly their butterfly to the flower to their right, brushing their body against the stamen (pipe cleaner), getting a deposit of pollen (corn meal) on their bodies before they fly to the next flower and leave the pollen on the stigma (cotton swab). Now the flowers can produce fruit and seeds.

BEE FINGER PUPPETS

1. Cut the fingers off small, yellow cotton gloves so that they measure 1½ inches from the fingertips or cut strips of yellow construction paper approximately 2" x 1½". The fingers from the gloves will be the bodies of the bees. If you are using paper, the strips should fit around the students’ index fingers. Use a marker to make bee stripes and a face.

2. Using waxed paper, form wings by cutting figure eights that are 2 to 2½ inches long. Make two slits (each ½ inch) in the body of the bee for the wings to slide through. You will have to fold one of the wings in order to slide it through the slits, then open it again.

3. Slip the bee onto a finger.

FLOWER STICK PUPPETS

1. Take one colorful, dessert napkin and cut it on the folded edge. Turn half the napkin so that you have eight points instead of four. Make a small slit in the center of the napkin pieces.

2. Put the cotton swab through the center slit.

3. Dip and roll one end of a pipe cleaner into corn meal. Fold the pipe cleaner in half. Poke the folded end of the pipe cleaner down through the center of the napkin. The pipe cleaner ends are the stamens and the cotton swab is the stigma.

4. Pinch the base of the napkin flower against the pipe cleaners and swab. Then twist the folded end of the pipe cleaner around the swab and the base of the flower to make a stem. Wrap a piece of tape around the base of the flower and stem.

5. Squeeze the top of the napkins around the pipe cleaners and swab to form the petals.
OPTIONAL ACTIVITY IDEAS CONTINUED

BOOKS ABOUT BUTTERFLIES
Read any of the butterfly books and look at the magnificent illustrations in the books listed in the Resources section.

SEE FOR YOURSELVES
Keep your eye open for a chrysalis that you can bring to your room and observe or order live chrysalises for your classroom. The students will enjoy watching the butterflies emerge. See the Resources list at the end of the lesson for information. Finding a native butterfly’s chrysalis is a better recommendation because the butterfly that emerges naturally is adapted to where you live; the purchased ones are new to your area.

TAGGING BUTTERFLIES
Contact the local conservation office and find out how to tag butterflies to follow their migration.

VISIT A BUTTERFLY HOUSE
Reiman Gardens at Iowa State University in Ames, Iowa, has a butterfly house where you can sit or stand while the butterflies hover around you in search of nectar from the beautiful plants and the handy feeders. It’s a great field trip for your group or you can go on your own. They also have an emergence window, where chrysalises and cocoons hang. You may actually see a butterfly emerge.

START A SPECIAL INTEREST CLUB
You may want to consider starting a 4-H special interest club of youth interested in learning more and doing more projects related to the environment. Contact your county ISU Extension office for more information.

REFERENCE AND RESOURCES

REFERENCE

RESOURCES
The Butterfly Celebration, Insect Lore, PO Box 1535, 123 South Beach Street, Shafter, CA. 93263. 1-800-Live-Bug. Butterfly pupae and chrysalis.

Monarch butterflies
http://www.mesc.usgs.gov/butterfly.html
http://monarchwatch.org

Activities and curriculum for kids
Butterfly Secret Code

Name
Use the code hidden in the garden to reveal the words in the sentences below.

1. Butterflies change through 13 5 20 1 13 15 18 16 8 15 19 9 19.

2. Butterflies lay tiny eggs on 8 15 19 20 16 12 1 14 20 19.

3. Monarch butterflies lay their eggs on 13 9 12 11 23 5 5 4 plants.

4. Little 3 1 20 5 18 16 9 12 12 1 18 19 hatch from butterfly eggs.

5. Some butterflies spend the winter in a 3 8 18 25 19 1 12 9 19.


7. Butterflies carry 16 15 12 12 5 14 from flower to flower.

8. Monarch butterflies 13 9 7 18 1 20 5 to Mexico in the fall.

9. Butterflies need 19 21 14 23 1 18 13 to their bodies for flying.

10. Butterflies need 23 1 20 5 18 to drink.
Butterfly Garden

Scale: $\frac{1}{2}'' = 1'$

Notes
1. Submerge a 10-inch pie pan in the garden so the edges are level with the top of the ground.
2. Cover the edges of the pie pan with flat rocks, approximately 6" x 8", and put a small flat rock in the pie pan.
3. Fill the pie pan with water and keep it filled.

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### Annual Garden Flowers

<table>
<thead>
<tr>
<th>Flower</th>
<th>space between plants</th>
<th>number of plants needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwarf marigold</td>
<td>8'</td>
<td>15</td>
</tr>
<tr>
<td>Tall zinnias (mixed colors)</td>
<td>8'</td>
<td>9</td>
</tr>
<tr>
<td>Dwarf ageratum (purple)</td>
<td>8'</td>
<td>9</td>
</tr>
<tr>
<td>Flowering tobacco (18&quot; tall, white) (Nicotiana)</td>
<td>12'</td>
<td>9</td>
</tr>
<tr>
<td>Petunias</td>
<td>8'</td>
<td>15</td>
</tr>
<tr>
<td>Parsley (bienneal)</td>
<td>6'</td>
<td>3</td>
</tr>
</tbody>
</table>

### Perennial Garden Flowers

<table>
<thead>
<tr>
<th>Flower</th>
<th>space between plants</th>
<th>number of plants needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedum 'Autumn Joy'</td>
<td>18'</td>
<td>3</td>
</tr>
<tr>
<td>Gayfeather (Latris)</td>
<td>12'</td>
<td>3</td>
</tr>
<tr>
<td>Shasta daisies</td>
<td>12'</td>
<td>3</td>
</tr>
<tr>
<td>Chrysanthemums</td>
<td>18'</td>
<td>3</td>
</tr>
<tr>
<td>Purple coneflowers</td>
<td>18'</td>
<td>4</td>
</tr>
<tr>
<td>Yarrow 'Coronation Gold'</td>
<td>18'</td>
<td>3</td>
</tr>
<tr>
<td>Bee balm</td>
<td>18'</td>
<td>3</td>
</tr>
<tr>
<td>Asters (dwarf, purple)</td>
<td>18'</td>
<td>3</td>
</tr>
</tbody>
</table>