Teacher Guide

Compagnia TPO
Farfalle

April 11, 9:45 AM
April 12, 9:45 AM & 1:00 PM

LIED CENTER OF KANSAS

Contents

About the Company
The Program
Scene 1, Night
Scene 2, The Egg
Scene 3, The Caterpillar
Scene 4, The Cocoon
Scene 5, Waiting
Scene 6, The Butterfly
Lesson Plans
Additional Resources
Butterflies is a show created by TPO, a theater company based in Prato, Italy. TPO was formed in 1981 as a visual theater group and in its early years it began to create original visual theater works for children's audiences. Currently it is exploring the use of digital technologies for the animation of images and sounds within a theatrical context.

From TPO's research in this area, shows have been created and conceived as "sensitive environments" where performers, or the audience itself, can interact through the use of specific technologies. Within these virtual sceneries, TPO's shows have been characterized by a strong visual impact and an original and refined style, based on a dramaturgy which privileges narration through images and choreography.

In the show the stage is "curled up" with a white carpet and two big wings. Images are projected onto two different surfaces: the horizontal plane of the carpet and the vertical one of the slanted wings. Some stylized props decorate the stage.

The subject of this show is a butterfly's lifecycle, presented in chronological order: the egg, the caterpillar, the cocoon, the pupa, the adult butterfly. The subject is simple, but the show is rich with different languages: dance, sounds, images, interactive animations. However, what makes the show special is that every scene has its own particular movement-sensitive environment; it is the dancers’ movements which cause new animated images and sounds to appear; dancers, acting as painters and musicians, compose the visual and sound frames which allow us to play with forms and colors...the world of butterflies.

The show is divided into two moments which alternate with each other: one part where the audience, seated at the sides of the stage, observes the dancers’ actions and another part where the audience, in small groups, is invited to enter the stage and participate.
Scene 1, Night

It is a summer’s night and we can hear the songs of crickets and other little animals. The two dancers living in this mysterious nocturnal environment play with fireflies, letting them dance in the air, letting their little curly pea branches ring, branches which will appear and disappear as the two dancers move by; they also meet and dance together in the wake of two big shiny leaves, rocking a little mysterious sphere.

Who Is Awake At Night?

At night there are animals that stay awake, fireflies, for instance, or crickets, moths...

Fireflies are little luminescent insects, that is, they emit light. If we look at one carefully, we will see that this light comes from their abdomen, their belly, which shines as if it were transparent and had a little lamp inside. But the male fireflies can also fly, so on summer nights, we can see their little light flying and shining in the air...

Moths are nocturnal butterflies; the colors of their wings are less conspicuous than the diurnal ones - and stay open even when they rest, or they shut them to form a kind of roof. Their antennae too are different; the diurnal butterflies have antennae ending in a club shape, while for moths they are antlered like a comb with a lot of hairs; these hairs are sensitive to movements and smells present in the environment, so they may feel what is happening around them.
Scene 2, The Egg

It is still night; is the sphere that the dancer carries with her an egg? On the big smooth elastic curls which now cover the stage, little by little dancers let many butterfly eggs appear; rocked by dance and sounds, the eggs wait to open up. It will be the sound coming from the two long curly flutes played by the dancers in the night, to awaken the eggs, that will then hatch.

Before Being Butterflies...

Butterfly Life Cycle

Every female butterfly lays her eggs directly on the leaves of a plant. From the eggs caterpillars will be born, feeding on those leaves, after eating the remains of their own eggs.

A butterflies favorite drink is a flowers sweetest nectar. To sip it, they use their built-in straw, an extension of their mouth called spirotrumpet, which they directly insert into the flower. Some moths even use it to pierce the beehive’s cells and steal honey from bees! In the breaks between one sip and another the straw—which in some species can be three times longer than the butterfly’s body—gets rolled under the head, where it won’t bother anyone.
Scene 3, The Caterpillar

The little caterpillars have broken out of the egg and are ready to play, to discover shapes, the round one, to discover all the colors, to move and roll, to go from one leaf to another, to eat, to discover the space surrounding them: mushrooms, grass, cobwebs.

The Green Artist

After a while the eggs hatch and a larva called a caterpillar is born, with no wings, so it cannot fly, but it has little legs under its belly so it can move. The caterpillar has a mouth with robust jaws, thanks to which it voraciously feeds on vegetable parts, especially leaves.

The caterpillar eats non-stop and grows a lot, but its cover, its skin, doesn’t grow with it and so when this gets too tight, the caterpillar throws it off and makes a new one; this change of ‘clothes’ is called molt. After undergoing many molts and reaching its highest development, the caterpillar stops feeding and looks for a suitable place where it can make the cocoon, under a leaf, on a branch, or on the ground.
Scene 4, The Cocoon

It’s night time again, perhaps it’s time to finish playing games and start weaving a thread, a long thread to swing on for a while and then wrap all around like a blanket snugly rolled round the body.

The Caterpillar's Listening Point

In the world there are many species of butterflies with different colors and shapes, so their cocoons can also have different shapes and colors. The cocoon is built by the caterpillar with a silk thread coming out of its mouth: it can be a simple thread that it hangs on to or, as you can see from the pictures at the side, it can cover itself all up with the thread, a lot of thread it wraps itself up with.

A Game To Play In Teams

Let’s imagine you are a caterpillar inside the cocoon; what sounds will you hear coming from out there?

Form two groups. One group will be the caterpillars; the other group will be the sounds. The group of caterpillars finds a comfortable position, possibly crouching, blindfolded, or under some cloth, and with hands covering ears, so as to filter sounds.

In twos or threes, led by an adult, the other group will imitate the sounds of nature:
- the water of a stream, flowing slowly/ fast
- the rain ticking down slowly / fast
- the wind blowing softly/ loudly
- crickets singing softly / loudly
- owls...

Next, roles are swapped, but, before that, when the caterpillars come out of the cocoon they will be asked which sounds they’ve heard, how they heard them, soft, loud, far away or close.
Scene 5, Waiting

While waiting, the caterpillar inside the comfortable cocoon, falls asleep, rocked by the wind and while it sleeps, it grows and gets transformed; after that it dreams, it dreams of being a butterfly with colorful wings. While waiting, time passes, clouds pass and the rain ticks...it knocks on the cocoon; will it be time to open up?

Lullabies

When the caterpillar is inside the cocoon, it stays still, it rests, but it also gets transformed, wings appear, its mouth turns into that straw which is called spirotrumpet, and many other things change turning it into a pupa.

As we wait for the caterpillar to transform, we may sing it a lullaby; can you remember or invent one?
Scene 6, The Butterfly

When it leaves the cocoon, it is different, it flies away, the air is light like wind, gliding and running; things, grass and flowers go fast; they seem to be flying. But especially colors...being inside them and being a color and, as a color, painting everything up, down, here, there....

**Butterflies' Colors**

When the pupa leaves the cocoon at last, it is a butterfly and, once it unfolds its wings, it starts flying...

But how can butterflies have all these colors on their wings? Butterflies’ wings are covered with minuscule scales (as you can see in the photo); in the scales there are tiny crystals which capture light and, according to the way they are inclined, they show one color or another – for example blue or brown.

Why do butterflies have all these colors and shapes on their wings? In most cases the colors and the patterns of butterflies’ wings represent a protection, allowing them to blend into the environment - leaves, flowers, stones- to deceive or not be seen by other animals, predators, which would like to eat them.

Blending in with the surrounding environment is called *camouflage*. 
Do you feel observed? No problem, this is not a real eye, but one of the two round spots, called *ocelli*, decorating the wings of the ‘owl butterfly’, widespread in South America. For some scholars these spots are to frighten lizards and little birds, greedy for this butterfly.

**Color and Symmetry**

Look at a butterfly closely; you will see that the left wing and the right are exactly the same, this is a remarkable example of symmetry in nature.

*But what does symmetry mean?*

The word *symmetry* is used to say that a shape or an object can be split into two parts which are the same. For example if you draw a line in the middle of a butterfly, the part on one side is exactly the same as the part on the other side (and, if you fold them in two, you can juxtapose them). The line separating the object into two equal parts is called the line of symmetry.

We can do an experiment to understand symmetry, and to make a beautiful artistic butterfly.

1. The first time you do this experiment, print the following sheet with the shape of a butterfly; then once you understand the game, you can do it on white sheet, and you will need finger paints or tempera tubes.
2. Fold the sheet into two, dividing it vertical-wise on the longer side (that is, divide the butterfly along the symmetry line).
3. Unfold the sheet and lay it on a surface.
4. Put some color at the center of the sheet; this will be the body.
5. Put the colors you like on one wing only, you don’t have to color it all; it is enough to put some colors here and there inside the border.
6. Close the sheet, press the two halves against the other, open it again and there are the two symmetrical wings of the butterfly.
7. Let everything dry.
All About Life Cycles

Fast Facts

1. A life cycle is defined as the complete succession of changes undergone by an organism during its life. A new cycle occurs when an identical set of changes is begun.

2. All organisms go through stages of development.

3. Environmental conditions such as water, temperature, and light affect the development of organisms.

4. In most mammals the stages of life go from the fertilized egg, to the fetus, the juvenile, and then to the adult.

5. Birds go from the egg, to the chick, to the adult.

6. Amphibians go from the egg, to the larva, to the adult.

7. Plants go from the seed, to the seedling, to the flowering plant.

8. Insect go from the egg, to the larva, to the pupa, to the adult.

9. Scientists can even describe the life cycle of a star or a plastic bottle.

10. Even families can have a life cycle. Most families have the parents come together as a unit. They can then have a child. The child becomes an adult. The new adult leaves home, finds a partner, produces offspring and the life cycle begins again.
Lesson Plans

Life Cycle of a Plant
Raquel Cantu

Grades: 1-2
Time Needed: 1-2 Weeks
Standards Addressed:
Learning Outcome:
  The students will learn the stages of the life cycle of a plant. The learner will also be able to photograph every stage of the life cycle of a plant and with teacher assistance will be able to create a photo story about the different stages of the life cycle of a plant.

Objectives:
• The learner will understand that plants have a life cycle.
• The learner will observe the changes that occur during plant growth.
• The learner will be able to identify each of the different stages of bean plant growth.
• The learner will be able to place in the correct sequence the different growth stages of a plant.

Materials:
Book: From Seed to Dandelion, The Magic School Bus: Gets Planted, or Soy una Semilla (depending on level and language of students)
Video (optional): The Magic School Bus Goes to Seed or The Magic School Bus: Gets Planted (Teacher can obtain videos from school library, public library or download from United Streaming.)

Activity Materials:
• Bean seeds
• Water
• Ziploc bags
• Cotton balls
• Clear tape
• Digital camera
• Computer

Introduction: (choose one or more of the following)
1. Read your chosen book and/or movie
2. Take a walk through School Grounds and used guided questions to introduce topic
   • "How do you think these plants or flowers got here?"
   • "How quick did they get here?"
   • "How long does it take them to grow to this size?"
   • "What do they need to continue to grow?"
   • "What happens if they don't get these things?"
3. Begin a discussion about the life cycle of a plant and their stages (seed, roots, stem, etc.)
4. Let the students know that they will each plant a seed and document the steps of a plant’s life cycle.

Seed Planting Procedures:
1. Capture a picture of every step of this process. Each student will use a minimum of five pictures. Give each student a Ziploc bag, one cotton ball, one bean seed, a piece of tape.
2. Instruct them to write their name at the bottom of their bags (with a marker if possible).
3. Instruct them to soak their cotton ball in water and then bury the seed inside the cotton ball.
4. Have them open the Ziploc bag and tape the cotton ball with the seed about 4 inches down inside the bag.
5. Grab a second cotton ball and soak it in water and have them squeeze some more water into the cotton ball that contains their seed.
6. Find a window that has access to sunlight daily and tape the Ziploc bags to the window. Remind them that they may have to add water to their cotton ball either daily or every other day. (Do not allow the cotton ball to dry out).
7. During the following days allow them enough time to observe their bag and take note of any changes (also allow them to take pictures of any changes in their bags).

Guided Practice:

*Create a short Photo Story of the Life Cycle of a Plant*

1. (minimum 5 photos). Introduce the photos (through projector or document camera) and allow students to identify the different stages of the life cycle.
2. Have them place the photos in order (sequence of events).
3. Once this is done and students seem to have mastered this activity, move over to the computer and introduce them to the Photo Story software.
4. Notes: The following steps might have to be mostly guided by the teacher, but once the students are more comfortable with Photo Story, the teacher can step back and allow them to work independently. Also, by this point, the teacher has already imported the photos into the computer.
5. Teacher may want to break the students into groups, that way all students are given the opportunity to create their group Photo Story.
6. Guide them on how to open Photo Story.
7. Show the students how to insert photos into Photo Story, by clicking and dragging.
8. Show the students how to insert text to describe the stage of the life cycle that is being shown.
9. Show the students how to insert “Audio”. Give opportunity for each student to insert his or her own voice.
10. Show them how to “Preview,” “Edit” and “Save”.
11. Note: Remember all of these steps will be guided by the teacher. If time permits, teacher can create a Photo Story with entire class first and then allow students to work in groups.

Independent Practice:

1. Draw/describe the sequence of a life cycle of a bean seed. Take a page and divide into four sections.
2. Have the students label the squares: 1-4.
3. Have the students illustrate and describe the steps of the bean’s life cycle.

Closure/Assessment:

* The students can be assessed by any or all of the following: Teacher Observation
* Being able to place in sequential order the life cycle of a plant.
* Being able to illustrate the life cycle of a plant.
* Group Assessment — Putting together a Photo Story on the Life Cycle of a Plant
Study Life Cycles with Butterflies
By Lynne Kepler

HANDS-ON SCIENCE: FROM CATERPILLARS TO BUTTERFLIES

Concepts: Insects undergo dramatic changes throughout their life cycle. All living things change during their lifetimes.

Skills: observing, predicting, measuring, communicating, comparing, and contrasting.
  • Vocabulary
  • Finding the Caterpillars
  • Making the Habitats
  • Activities Kids Love
  • Extension Activity: Circle of Life
  • Resources: Books, video, software, butterfly suppliers

Vocabulary
- caterpillar: the larval stage of a butterfly or moth
- chrysalis: the hard shell covering the pupa; shaped like an upside down teardrop
- larva: the second stage of metamorphosis, during which an insect is wormlike and has new wings
- pupa: the third stage of metamorphosis; encased by a chrysalis
- metamorphosis: a series of developmental stages often marked by body changes

Finding the Caterpillars
The best way to find caterpillars is to locate their food source. Monarch caterpillars feed only on milkweed. Several species of this common wildflower grow throughout the United States. To find the yellow-black-and-white-striped caterpillars, lift the plant’s leaves. Gently pull the caterpillars off and transport them in a ventilated jar to school. If you’d rather purchase caterpillars, see the resources below for ordering information.

Making the Habitats
To care for the caterpillars, you will need a container that allows them to get air and to move around. A small aquarium with a screen lid works well. If you wish to have groups of students make their own caterpillar habitats, here is an easy way to do it.

1. For each group of students, gather two plastic 2-liter soda bottles (emptied and cleaned) and a small piece of window screening.
2. Cut the top off around the shoulder of one of the bottles, as shown. (If working with younger students, cut the bottles for them.)
3. To make a lid for the habitat, set the base of the second bottle in warm water and then pull it off. Cut a piece of wire screen to fit inside the lid. Tape the screen in place. This will give the caterpillars a place to attach themselves and keep them from escaping.
4. Add the caterpillars and a few fresh, moist leaves — the kind your caterpillar eats — to the habitat. (If you order a butterfly kit, you’ll get the food with it.) Replace the food supply as needed.

Activities: It takes about two weeks for a caterpillar to become a chrysalis. Here are some investigations your students can do as you watch the caterpillars grow.
  • Make a bar graph. Ask students: How much do the caterpillars grow? Do they all grow at the same rate? To find out, students can measure the caterpillars using a piece of yarn. Cut the yarn to match the length of each caterpillar, then tape the yarn pieces to a sheet of 9-by-12-inch construction paper. Record the date on the paper next to the pieces of yarn. Students can do this every few days, creating a bar graph of the caterpillars' growth.
  • Make a line graph. Invite older students to use rulers to measure the caterpillars' growth daily and record their data in a notebook. Students can determine the average daily growth rate of their caterpillars. They may also make a line graph noting any growth spurts or plateaus. Do the students notice any patterns?
• Keep daily diaries. How does a caterpillar change? Students can keep daily journals, describing in words and pictures the caterpillars' changes. Once the caterpillars have become chrysalises, invite students to make a sketch in their journals of what they think the butterfly will look like, then make another sketch when the butterfly emerges. After the butterflies have emerged, move them to an aquarium to observe for a day or two before releasing them. Place a wet sponge in a dish so they have water to drink.

Extension Activity: Circle of Life
Discuss with students how the butterfly develops through four stages of metamorphosis — egg, larva (caterpillar), pupa (chrysalis), and adult (butterfly). The adult barely resembles the larval stage in appearance or behavior. This is known as a complete metamorphosis.

Invite students to compare the butterflies' growth and changes with their own growth and development. Ask them to bring in pictures of themselves as infants and toddlers. Using these photos and their caterpillar charts and diaries, students can create two circles of life — one for the butterfly and one for themselves. To make a circle of life, each student will need two sheets of white construction paper, a file folder, and a brass paper fastener. Here's how to assemble the circles.

1. Glue two sheets of paper together along one edge. Mark and cut out a 1-inch window from the top sheet.
2. Cut out a circle from the file folder. The diameter of the circle should just about match the width of the paper. Poke a small hole through the center of the circle.
3. Have students paste their photos or caterpillar/butterfly drawings onto the circle, as shown.
4. Insert the circle between the sheets of paper, leaving one edge of the circle — which will now function as the wheel — exposed. Adjust so that each picture shows up through the window when you turn the wheel.
5. Using the paper fastener, fasten together the wheel and the paper, then glue the paper edges, leaving only the section with the wheel edge open.
6. Students can share their circles with each other, narrating the changes seen through the window.
7. Students can also use photographs of parents, grandparents, and so on to create more life-cycle wheels. Invite students to brainstorm what other kinds of life cycles they can depict.

Resources
Books
Butterfly Story by Anca Hariton (Dutton, 1995)
Life of the Butterfly by Heiderose and Andreas Fischer-Nagel (Carolrhoda, 1995)
The Butterfly Alphabet Book by Brian Cassle and Jerry Pallotta, illustrated by Mark Astrella (Charlesbridge, 1995)
The Moon of the Monarch Butterflies by Jean Craighead George (HarperCollins, 1993)

Video
Geo Kids: Tadpoles, Dragonflies, and the Caterpillar's Big Change (National Geographic Society). For information or to order, call (800) 368-2728.

Software
Animals and How They Grow (for Macintosh) is a CD-ROM package for grades K-2. Use it to compare insect and other animal life cycles. (National Geographic Society, [800] 368-2728).

Butterfly Suppliers
The following companies will ship painted lady caterpillars directly to your school. They also have catalogs of other butterfly-related materials.
Insect Lore, P.O. Box 1535, Shafter, CA 93263; (800) LIVE-BUG
Let's Get Growing, 1900 Commercial Way, Santa Cruz, CA 95065; (800) 408-1868
Additional Resources

Learning to Give
http://learningtogive.org/lessons/unit369/
Unit about the Monarch Butterfly
Monarch Butterfly USA
http://www.monarchbutterflyusa.com/Cycle.htm
More about the Monarch Butterfly and it's life cycle
National Geographic Kids
http://kids.nationalgeographic.com/kids/animals/creaturefeature/monarch-butterflies/
Facts, Photos, Videos, and more about the Monarch Butterfly

Portions of this guide were borrowed from
Compagnia TPO's "Farfalle" guide.