



Exploring Life Cycles and the Metamorphic Change of Butterflies

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This curriculum unit is recommended for:
literacy and science in grades K-2

Keywords: butterfly, butterflies, life cycles, insects, fluency, reading strategies

Teaching Standards: See [Appendix 1](#) for teaching standards addressed in this unit.

Synopsis: This unit takes a look into the metamorphic change of butterflies. We begin by integrating various forms of literacy while introducing the topic of caterpillars, butterflies and life cycles. The incorporation of fluency exercises to promote literacy and comprehension skills takes place through reader's theatre scripts and poetry. Students will also take a look into insects. They will learn what characteristics make up insects and that insects go through metamorphosis. Several different graphic organizers will be integrated to help students organize and synthesize information about insects and life cycles. Different types of life cycles will also be taught in order to reach all types of learners. There is an opportunity to bring live specimens into the classroom for observation and more visual learning. As a final activity for learning about butterflies and life cycles, students will have the opportunity to create a butterfly habitat as a way to observe and continue to learn about metamorphosis in an ecological context. A variety of read alouds and writing activities will also be used to improve literacy skills or decoding, fluency, comprehension and writing skills. This unit is a interdisciplinary collection of activities centered about literacy, science, metamorphosis and butterflies. It can easily be adapted to older grades.

I plan to teach this unit during the coming year to 25 students in my first grade classroom as well as sharing this unit with teachers on my grade level and the kindergarten and second grade team for usage in their classrooms.

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Nikki Guevara

Introduction

As a student in my educational journey through elementary, middle and high school, I remember being particularly interested in science. I loved everything about it. The topic of biology was the most intriguing to me.

As a first grade teacher, the concept of biology is fairly common to students. Although they may not have the scientific vocabulary and terminology dealing with topics of *biology*, students know about animals and insects and generally exhibit an inquisitive love of nature. In this unit, we will discuss insects and life cycles while focusing on the metamorphic change of butterflies. I will base the unit on Eric Carle's book, The Very Hungry Caterpillar in order to incorporate literacy and science skills in a cross-curricular unit for first graders.

While attending the seminar, "Metamorphosis: Transformative Experiences" led by Dr. Amy Ringwood from The University of North Carolina at Charlotte, I began to realize how I could use biological, transformative experiences to teach the scientific concepts about life cycles while incorporating literacy skills to promote comprehension in the field of reading and scientific knowledge.

Throughout this seminar, we have learned about the life cycles of various animals and the principles of metamorphosis. I will use this information with our science objectives dealing with biology in order to teach first graders about metamorphosis and incorporate literacy skills to enrich and challenge students.

I plan to make this curriculum unit available for other teachers at my school and beyond in order to utilize these literacy activities and promote skills such as decoding, word recognition, vocabulary, fluency and comprehension. This unit will also give students the ability to understand life cycles and the metamorphic change in butterflies.

In first grade, students will learn to: *summarize the needs of living organisms for energy and growth*. We will use this objective while incorporating physical changes of insects to learn about life cycles and metamorphosis.

I will also use literacy elements in a scientific setting to create a unit promoting the topic of *metamorphic change* in butterflies to help master reading skills such as:

decoding
word recognition

vocabulary
fluency
comprehension

My goal is to use the information presented and taught from the seminar to teach and scaffold information for students as they participate in various activities. Since first graders are learning to read and write. These activities would be a great way to incorporate science and literacy. The end result would include students understanding the physical and internal changes of insects. After information was presented to students in the form of teacher-led material, students would use their new knowledge with the help of technology and hands-on activities to better understand this scientific concept. This would allow students to become biological experts when dealing with life cycles and metamorphosis. This curriculum unit will help relay important scientific information to students at a young age so they can learn to appreciate and understand the world around them.

School Demographics

Bain Elementary School is an elementary school serving close to 1000 students in kindergarten through fifth grade. The school is located in Mint Hill, North Carolina in the Charlotte-Mecklenburg School District. This school system is the second largest in North Carolina and the nineteenth largest in the nation.

I am currently a first grade teacher at our school. This is my eleventh year in the Charlotte-Mecklenburg school district. I am one of six first grade teachers and I teach using the North Carolina Common Core standards (NCCC). I incorporate various literacy-based teaching methods including: Balanced Literacy, Words Their Way, Making Meaning/Vocabulary, guided reading, differentiated teaching methods, flexible grouping, 21st century skills, technology and current research-based strategies to teach and promote reading skills for all students. I have taught first, second and third grade over the past eleven years. I have experienced the vertical planning aspect by teaching in a variety of grades. I have also seen the developmental process of students *learning to read* in grades K-1 and also *reading to learn* in grades 2-3.

Teachers at my school use flexible grouping to differentiate student instruction based on individual needs. Balanced literacy programs are used and include: word work, independent reading, supported reading with the teacher and writing daily help reinforce academic concepts learned in the classroom. Our school motto is *to challenge and prepare students for future success*.

Technology is constantly used to enhance learning opportunities on a daily basis. Teachers in grades K-5 have access to the following pieces of technology: document camera, mounted overhead projector, 11 iPads per classroom (10 for students and 1 for

the teacher), as well as an Apple TV, cordless mouse and keyboard. Teachers also have subscriptions to magazines such as *Scholastic News* and teaching resources such as *Discovery Education* to help further promote technology and nonfiction text.

Content Objectives/Rationale

This cross-curricular literacy and science unit is intended for first graders to help master literacy skills, increase vocabulary, fluency and ultimately increase comprehension while learning more about biology. This unit will be based on understanding concepts of life cycles and metamorphic change. This unit could be adapted to meet the needs of students in grades K-2 and could take place from anywhere to 2-6 weeks. The objectives include:

Students will be exposed to various activities and classroom lessons in order to facilitate their understanding of the scientific concepts.

A strong focus on literacy will be emphasized as we use the scientific topics to become better readers and increase their overall nonfiction text information.

Specific attention to life cycles and metamorphic change in butterflies will be highlighted.

We will also focus on the following four major topics in this curriculum unit:

1. Descriptions of insect characteristics and their basic ecology
2. The components of a life cycle
3. Creating of a butterfly life cycle project
4. Creating a natural butterfly habitat

Students will focus on these four topics as they learn about insects, life cycles, metamorphosis and the transformative changes a caterpillar goes through as it becomes a butterfly. I will also incorporate literacy instruction, such as decoding and comprehending, from non-fiction texts about life cycles and metamorphic change as well as fictional texts relating to butterfly stories.

The North Carolina Standard Course of Study objectives that will be taught in the unit deal with science, writing and literacy:

Science: 1.L.1-Understand characteristics of various environments and behaviors of humans that enable plants and animals to survive and 2.L.1-Understand animal life cycles.

Writing: CCSS.ELA-Literacy W.1.5-With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed and CCSS.ELA-Literacy W.1.2-Write informative/explanatory texts in

which they name a topic, supply some facts about the topic, and provide some sense of closure.

Literacy: CCSS.ELA-Literacy RI.1.10-With prompting and support, read informational texts appropriately complex for grade 1.

Background Information on Literacy Instruction

According to G. E. Tompkins in the 2006 edition of *Excerpt from Language Arts Essentials*, there are five factors for reading instruction that promote reading skills. Those factors include: phonemic awareness, phonics, vocabulary, fluency and comprehension. Equally important are skills of word identification as well as motivation. Students need to be well versed in each of these topics in order to succeed as a reader.

By directly teaching reading strategies in these areas, along with modeled reading skills and thinking aloud with read alouds dealing with life cycles and metamorphosis, students will have the opportunity to increase his or her reading abilities in and out of the classroom setting.

Decoding/Word Recognition

According to LaBerge & Samuels, "capable readers have a large bank of words that they recognize instantly and automatically because they can't stop and analyze every word as they read. Through a combination of instruction and reading practice, students' knowledge of words continues to grow."

In this unit, I will incorporate word identification and fluency with a teacher created reader's theatre script dealing with these science topics in order to increase word knowledge to help promote quick recognition of words and increased vocabulary.

Vocabulary

J. Pikulski and S. Templeton describe the power of vocabulary in their 2004 article, *Teaching and Developing Vocabulary: Key to Long-Term Reading Success*. They quote that the "greatest tools we can give our students for succeeding, not only in their education but in life, is a large, rich vocabulary."

In this literacy-based science unit, I plan to use read aloud books and various forms of literature to expose and broaden the vocabulary of my students. By increasing their vocabulary, I am ultimately increasing their reading skills because I am presenting new information that will increase their background knowledge and schema for future reading experiences. They will use the strategy of journaling to record new vocabulary and information learned.

Fluency

The National Reading Panel report defines reading fluency as "...the ability to read text quickly, accurately and with proper expression." Capable readers have learned to read fluently—quickly and with expression. Three components of fluency are: reading speed, word recognition, and prosody.

According to the National Reading Panel, a recent study sponsored by the U.S. Department of Education found that "fourth grade students' oral reading fluency is a strong predictor of silent reading comprehension. Moreover, the same study found that nearly half of the fourth graders studied had not achieved even a minimally acceptable level of reading fluency. Fortunately, a solid body of evidence suggests that fluency can be taught and that effective instruction in fluency leads to overall improvements in reading."

In this unit, students will be exposed to fluency passages based on the topic of butterflies. By practicing fluency, students will have capabilities of reading "quickly and with expression." This reading strategy will promote the next level of learning, comprehension.

Comprehension

Comprehension is the main goal of reading instruction. It is the top of the "reading mountain" so to speak. Comprehension is not only important in the present when a student is reading and responding to text, but it is important for future instances of recalling information.

By incorporating visuals and fluency practice in the classroom, students will have practice reading fluently with peers and working towards becoming more proficient with new vocabulary and word recognition while learning about the biological changes in butterflies.

Background Information for Metamorphosis, Life Cycles and Literacy Activities

It is important to have some knowledge on these scientific topics as you teach the unit. The book [How to Raise Monarch Butterflies](#) by Carol Pasternack is a great reference. Here are some basic facts according to Pasternack and from my seminar professor, Dr. Amy Ringwood, about metamorphosis, life cycles and butterflies that may be helpful for your unit.

Metamorphosis

Metamorphosis as defined by our seminar leader is: a transformation or marked change in appearance, character, condition or function. In our seminar, we learned there are two different types of metamorphosis: complete or incomplete metamorphosis. In complete metamorphosis, the young is very different in appearance and habit than the adult. There are four stages: egg, larva, pupa and adult. The larvae are worm-like, eat constantly and grow rapidly. The following insects go through complete metamorphosis: lace wings, beetles, scorpions, flies, caddis flies, wasps, bees, fleas, moths and butterflies. Most insect species go through complete metamorphosis where the larvae stage is much different than the adult stage. Incomplete metamorphosis is not as drastic. The young look and act like the adult, except they are smaller. The following insects go through incomplete metamorphosis: stink bugs, earwigs, crickets, grasshoppers, cockroaches, praying mantis and ants.

Life Cycles

According to kidsconnect.com and Carol Pasternack, a life cycle is defined as the complete succession of changes undergone by an organism during its life. All organisms go through stages of development. Environmental conditions such as water, temperature, and light affect the development of organisms. Insects go from the egg, to the larva, to the pupa, to the adult. Insects, plants, animals and humans all undergo some type of life cycle.

Butterflies

Butterflies belong to the category of insects. According to our seminar leader and Stephanie Turnbull in her book, Caterpillars and Butterflies, insects have six legs and a segmented body made up of three parts: head, thorax and abdomen. The thorax consists of three segments behind the head and that is where the wings and legs are attached. Insects have an external skeleton (exoskeleton) and can go through one of the two types of metamorphosis: complete or incomplete metamorphosis. The development of a butterfly from egg to adult takes about 3-4 weeks. Butterflies undergo several stages in their life cycle: egg, caterpillar (larva), pupa (chrysalis) and adult (butterfly). Female butterflies can lay several hundred eggs that will hatch into caterpillars. The main purpose of the caterpillar is to eat. Some species are generalists that will eat a variety of types of plants, while others may be specialists, feeding only on specific plants. Since they have an external skeleton, caterpillar larvae shed their skin periodically (a process known as molting) as they get bigger. This happens 5-6 times as they grow. The pupa stage normally lasts 10-14 days but is also a stage that can last much longer as a mechanism to overwinter. When the butterflies emerge from the pupae, they are very fragile and their wings are crumpled and moist. It takes about 15 minutes for the wings to emerge and straighten with the help of fluid from the abdomen being pumped into them. It also takes several hours for the wings to dry completely. All butterflies have four wings

as adults: two forewings and two hindwings. Most butterflies feed on flower nectar and will visit many types of flowers.

Literacy Activities

There are many activities to incorporate but here are a few hands-on, kinesthetic activities to use to present and review information in an engaging way.

Graphic Organizers

A graphic organizer is a visual display that shows relationships between facts and or ideas. It can be referred to as knowledge maps, concept maps, cognitive organizers, advanced organizers or concept diagrams. These visual representations show how information is categorized in an effective way to facilitate knowledge and understanding of a topic.

Foldable Books

Dinah Zike is responsible for the 3-dimensional graphic organizers called foldable books. Foldables help students organize, remember, review and learn different types of information. This is an interesting and motivating, hands-on approach to reach all learners by using creative paper folds to organize and represent information in a kinesthetic way. Some popular paper folds include: hamburger, hotdog, valley, shutter, taco, burrito and mountain just to name a few. More examples can be found in Dinah Zike's book, Foldables.

Using Poetry and Reader's Theatre to Build Fluency

Poems and rhymes are beneficial for repeated readings which help build fluency and ultimately comprehension. Repeated readings help build fluency in students in a natural and authentic way. Reader's theatre is an oral performance of a script based on authentic literature. Its meaning is conveyed through expression from the reader and or readers. This type of repeated practice through rereading and performing helps students become more natural and smoother readers by focusing on the three components of fluency. The three components are: *accuracy*, the automaticity when reading a text, *rate*, the speed and *prosody*, the expression when reading. Using poetry and reader's theatre scripts are both engaging and interactive for students as they practice to become better readers.

Teaching Strategies

Some strategies I plan to use include read alouds and journaling. Read alouds will be used throughout the unit in order to model proper reading and writing skills, increase vocabulary and promote class discussion. I plan to use books and information appropriate

to first grade students in order to promote conversation and collaboration among peers regarding butterflies. Read alouds are a great way to share information and create small teaching moments about our topics. Some books that relate to insects, butterflies and metamorphosis, include:

Insects by Robin Benard

The Very Hungry Caterpillar by Eric Carle

Charlie the Caterpillar by Dom Luise and Christopher Santoro

How to Hide a Butterfly & Other Insects by Ruth Heller

Insects Are My Life by McDonald and Paul Brett Johnson.

I Can Read About Insects by Deborah Merrians and Norman Nodel

Caterpillars and Butterflies by Stephanie Turnbull, Rosanne Guille, and Uwe Mayer

Bugs, Beetles, and Butterflies by Harriet Ziefert and Lisa Flather

Journaling in the form of a composition or spiral notebook will be used on a daily basis to integrate writing across the curriculum and scientific information they have learned. Students will have opportunities to write, ask questions, illustrate, etc. in individual journals regarding information they are learning. The journals will be a place of reflection for future use with their questions, observations and thoughts about butterflies, life cycles and metamorphosis. Throughout the unit, students will keep a vocabulary section in their journals as well to gain reading exposure by learning and defining new vocabulary words.

We will often use the pre-reading strategy called *Turn and Talk*, to discuss prior knowledge of a topic, discuss questions I use and their thoughts and ideas. This allows students to orally discuss thoughts and scientific information in a non-threatening way and also learn to work collaboratively with others.

As the unit progresses, information about butterflies will also be gathered from educational websites to help promote their knowledge by exposing them to visual aids and information. We will also take a look into the geographic movement of butterflies and what attracts them to certain places or areas. We will work to create a habitat for monarch butterflies and pollinators through the help of *monoarchwatch.org*.

Mini-books will be used throughout the unit as familiar rereads that will help build vocabulary and fluency to promote reading ability. Mini books will be created individually by students based on topics taught in class and their responses to that information. These mini-books will be the product of the research the students will conduct in print and online. Students will work together to promote collaboration and fluency practice as they share their knowledge and points of views on various topics from their individually created mini-books. Interesting facts and vocabulary will be used and incorporated as well. Students will also have the opportunity to use their mini-book

information to create a class book about butterflies that will be shared with their peers and parents.

Throughout the unit, students will be reading books, creating and rereading mini books, sharing journal entries, increasing their vocabulary, practicing fluency, improving their writing skills and conventions as well as collaborating with each other and incorporating artistic elements in the form of illustrating for a class book.

This unit will be a beneficial way to promote cooperative learning, engaging students in scientific topics as well as integrating across the curriculum for an ultimate goal of *increasing reading abilities, promoting reading and writing development* and *setting a foundation* for biological knowledge and objectives of understanding what a life cycle is and what insects undergo metamorphic change.

Classroom Activities

The classroom activities will be centered around four topics and also include a literacy connection with reading and or writing to build knowledge, fluency and comprehension with the young readers.

We will focus on four major topics in this curriculum unit:

1. Descriptions of insect characteristics and their basic ecology
2. The components of a life cycle
3. Creating of a butterfly life cycle project
4. Creating a natural butterfly habitat

Activity #1 - The Very Hungry Caterpillar

Objective: In this activity, students will learn about butterflies and life cycles through a read aloud of Eric Carle's The Very Hungry Caterpillar. Teacher will use a KWL chart to help gather information and ideas about butterflies. Students will also make a caterpillar and butterfly craft.

Background Information: A KWL chart is a graphic organizer that is divided into 3 columns. Students will begin with listing what they KNOW about butterflies, and what they WANT to know about butterflies. At the end of the unit, students will reference this chart with the help of the teacher and fill out what they have LEARNED about butterflies.

Introduction: Students will be introduced to the topic of insects by completing a KWL chart. Students, as a group, will use the *Turn and Talk* strategy to discuss what they KNOW about insects, what they WANT to know about insects and then will revisit this chart with what they have LEARNED about insects. The KWL activity will be

completed whole group and then the read aloud will take place.

Activity: The first activity will be a read aloud from Eric's Carle, The Very Hungry Caterpillar. This is a helpful tool to introduce insects while scaffolding information about butterflies. Students will be introduced to insects, caterpillars and the topic of life cycles. After the read aloud, students will participate in a craft where they can create a caterpillar or a butterfly or both.

Caterpillar Craft:

You will need a sock, rubberbands, googly eyes/pipe cleaners, a glue gun, pillow stuffing and optional popsicle sticks.

First, stuff the sock with fluff and then knot the end of the sock. Next, use rubber bands to section off the sock. Then, you can add eyes and antenna to the caterpillar with the glue gun.

Butterfly Craft:

You will need construction paper, scissors, paint, paintbrushes and a pencil.

First, fold the construction paper in half and sketch out half of the wings and body of a butterfly on the crease of the paper. Use the scissors and cut out the butterfly on the creased side of the butterfly. Then, you can open your symmetrical butterfly and use the brushes and paint to make your own design on one half of the insect. Finally, fold the wings in half to transfer the paint symmetrically onto the other half of the butterfly wings. The butterflies can be glued to the popsicle stick for easy handling to protect the butterfly craft.

Closure: Student crafts will be shared whole group to further teach the characteristics of caterpillars and butterflies. The crafts will be used for a future reader's theatre activity.

Extension: Students can use the caterpillars and butterflies as a reading buddy during independent reading time and or used as a prompt for writing in the future.

Activity #2 - Reader's Theatre with The Very Hungry Caterpillar

Objective: In this activity, students will practice their fluency using Eric Carle's The Very Hungry Caterpillar. They will be able to read and reread the reader's theater script to build fluency and comprehension with small groups in class.

Background Information: Reader's theatre scripts promote fluency which will increase student abilities of reading *quickly and with expression*. This script will be based on the book, The Very Hungry Caterpillar.

Introduction: Students will be introduced to the topic of reader's theatre scripts as a way to build fluency and comprehension in a fun and engaging way. Students will work in small groups to rehearse, practice and perform the small plays. Additional reader's theatre scripts are available in a variety of topics and levels.

Activity: Students will use the reader's theatre script based on Eric's Carle's book, The Very Hungry Caterpillar (See Figure 1). Students will be broken into small groups to practice reading the script and using their best actor/actress voice as they read aloud and act out the play. They will also read and reread the script to build fluency before presenting to the class.

Closure: Students will perform the script of The Very Hungry Caterpillar as a play to the class or small groups. They can add movement, hand gestures or any theatrical movements they wish in order to present the information in a fun and creative way. Students can use their caterpillar and or butterfly craft from Activity #1 as a prop in the reader's theatre play.

Extension: Students can practice sequencing life cycles by breaking into three person group using the crafts of the caterpillar and butterfly and then adding a chrysalis element. Students can be wrapped in toilet paper to simulate a chrysalis. Students will then sequentially order themselves: caterpillar-chrysalis-butterfly for a interactive extension to the story of The Very Hungry Caterpillar.

Activity #3 - If I Were a Butterfly/If I Were a Caterpillar

Objective: In this activity, students will increase their writing skills as they complete a Venn diagram to compare and contrast a caterpillar and a butterfly as well as taking on a different point of view to write about the daily life of a caterpillar or butterfly.

Background Information: Venn diagrams are an effective way to present information on more than one topic. It is a graphic organizer that uses overlapping circles to visually represent information and details on certain subjects. The outer spaces of the two overlapping circles are for information specific to one topic and the overlapping area in the middle represents the characteristics they have in common.

Introduction: Students will be introduced to a Venn diagram to compare and contrast a caterpillar and a butterfly. Students will later use this information to write from the first person point of view of the insect and take on the personality of a caterpillar or an insect and tell what his or her daily life would be like.

Activity: Students will complete a Venn diagram on caterpillars versus butterflies. Students will use physical characteristics to determine the commonalities as well as differences between caterpillars and butterflies. Students will then take on the roll of a

caterpillar or a butterfly and apply their writing skills and strategies to compose a piece about their life through the eyes of one of those insects. A sentence starter would be: *If I were a caterpillar....* or *If I were a butterfly...*

Closure: Students will share their writing pieces and review information learned about the life of a caterpillar or the life of a butterfly from the Venn diagram. Teacher will assist in the editing and publishing process of this writing activity in order to help strengthen the writing skills of students.

Extension: Student responses can be collected and published in a class book. Class books are a beneficial way to promote fluency. When students reread familiar text, this helps foster comprehension and reading confidence.

Activity #4 - What is an Insect?

Objective: In this activity, students will learn the characteristics of insects and create their own insect based on an Insect Checklist and then illustrate and write about their insect to build literacy skills of reading and writing (See Figure 2).

Background Information: The definition of an insect, as defined by the Merriam Webster dictionary is: small invertebrate animal that is segmented with well-defined head, thorax and abdomen with only three pair of legs and one or two pairs of wings.

Introduction: Students will be introduced to the topic of insects by showing visuals of insects as well as reviewing the criteria of an insect: head, large eyes, thorax, abdomen, six legs and one or two pairs of wings. Students will create their own insect using the Insect Checklist as they learn more about insects.

Activity: Teacher will begin by showing various diagrams of insects and guiding students through labeling insect parts as they begin to gain knowledge of what an insect is in preparation of building their own insect. Students will use the Insect Checklist to create their own insect and then they will name and describe the life of their individual insect.

Closure: Student insects will be shared whole group to further teach ecology of insects and increase practice writing sentences by describing the topic and adding details to their illustrations and writing. Students will have the opportunity to showcase their own understanding of the definition of an insect through their individualized insect creations. They will also practice literacy skills as they write and reread their own and the writing pieces of other students to build fluency.

Extension: Student responses can be put together in a class book. Class books are a great way to promote fluency. When students reread familiar text, this can help foster comprehension and their overall confidence in reading.

Activity #5 - Creating a Butterfly Life Cycle Foldable Book

Objective: In this activity, students will focus on butterflies as they learn more about the specific transformation in the butterfly life cycle.

Background Information: According to Carol Pasternak, butterflies undergo complete metamorphosis. They change completely from the larva stage to the adult. Butterflies begin as an egg, then they grow into a caterpillar, also known as the larva. After that, they turn into the pupa, or chrysalis, and finally the adult butterfly.

Introduction: Students will become familiar with the life cycle of the butterfly and complete a foldable book as a way to showcase their knowledge. Information about the specific life cycle and timeframe of a butterfly will be presented at this point.

Activity: Students will complete a foldable book describing the life cycle of a butterfly. There will be four foldable designs based on the four stages of a butterfly life cycle: egg, caterpillar/larvae, pupa/chrysalis and butterfly. Teacher will inform students about the timeframe and specifics of a butterfly life cycle. Students will make four folds for specifically explaining and reviewing each part of the butterfly life cycle. See Dinah Zike's book, Foldables, for visual examples.

Closure: Students will share their foldable books and then create writing pieces describing the life cycle to use for building fluency about the metamorphosis of butterflies. They will share and practice rereading passages and foldable books to build fluency and comprehension.

Extension: Teachers can also bring in a real life aspect of butterflies in the classroom for observation through the life cycle stages by ordering classroom butterfly kits from *insectlore.com*. These classroom kits are a wonderful way for students to observe the metamorphosis of butterflies in their four stages of their life cycle.

Activity #6 - Interactive Life Cycles

Objective: In this activity, students will focus on what life cycles are and why they are important for insects. Students will learn about life cycles through literature and create a visual representation of a life cycle. Students will familiarize themselves with different stages of a butterfly life cycle and how these insects can change through the completion of a life cycle diagram.

Background Information: The definition of a life cycle according to Pasternak is a series of stages through which something passes during its lifetime. Kidsconnect.com states that a life cycle is the complete succession of changes undergone by an organism during its life. All organisms go through stages of developments. Insects go from the egg, to the larva, to the pupa and then to the adult. For first graders, it is important for children to understand how insects change and go through life cycles.

Introduction: Students will be introduced to the topic of life cycles by creating a visual representation of the butterfly life cycle (See Figure 3).

Activity: Students will complete a representation of a life cycle to learn and review the different stages of a butterfly life cycle: egg, caterpillar/larvae, pupa/chrysalis and adult butterfly. Students will first focus on learning the stages of a life cycle and how insects change from a caterpillar to a butterfly. Other life cycles you may want to explore include: frogs, ladybugs, grasshoppers, ants, moths, beetles, praying mantis, silkworm, etc. You can use any type of model to teach the life cycle as long as students understand the various stages and changes taking place. Some butterfly life cycle models include:

A butterfly life cycle based on dried noodles: egg (dried white bean or beans), caterpillar (spiral noodle), chrysalis (shell pasta) and butterfly (bow tie pasta)

An edible butterfly life cycle: egg (marshmallow), caterpillar (gummy worms), chrysalis (Tootsie Roll) and butterfly (butterfly-shaped crackers)

These life cycle models can be represented on paper, construction paper or paper plates.

Closure: Students will share their life cycle models with a partner or small group in order to showcase what they have created and learned.

Extension: Students can respond in journals about life cycles and the different stages that take place in butterflies while using vocabulary such as: egg, larva, pupa, chrysalis, adult, etc. They could also create mini-books to take home for additional reading practice.

Activity #7 - Butterfly Cinquain Poem

Objective: In this activity, students will focus on fluency and writing as they incorporate poetry into their butterfly activities by creating a cinquain poem. See Figure 4 for information on how to create a cinquain poem.

Background Information: Butterflies undergo a complete metamorphosis. They change completely from the larva stage to the adult. Butterflies begin as an egg, then they grow into a caterpillar, also known as the larva. Then, they turn into the pupa and finally the butterfly as the adult.

Introduction: Students will be introduced to poetry read aloud and or projected in the classroom dealing with caterpillars and or life cycles as inspiration for student poetry writing. Students will use writing skills to create a cinquain poem about butterflies.

Activity: Teacher can use poems about caterpillars and butterflies available from *canteach.ca*. There are multiple poems about caterpillars, butterflies and life cycles available to share with students. Students will be able to practice rereading these poems to build fluency as they prepare to write a cinquain poem. Students will use the word *caterpillar* as the beginning of their cinquain and then close with *butterfly* while including various describing, action and feeling words in the poem. (See Figure 4).

Closure: Students will share their poems to practice rereading that will build fluency and comprehension while learning more about literacy and scientific life cycles.

Extension: Teachers can also bring in a real live aspect of butterflies in the classroom for observation through the life cycle stages by ordering classroom butterfly kits from *insectlore.com* to bring in caterpillars and eventually butterflies into the classroom.

Activity #8 - Creating a Butterfly Habitat

Objective: In this activity, students will learn how to create a butterfly habitat, or a butterfly garden. This will be a way to implement conservation of this insect and help increase awareness for butterflies and other insects.

Background Information: Butterfly gardens are a great way to attract insects and help your students learn more about the world around them. It is important to research the types of butterflies that live in your area. Specific host plants and nectar plants are needed for certain varieties of butterflies. Host plants are the plants needed for the larvae or caterpillars. Nectar plants are needed for the butterflies. You will need both types for a butterfly habitat.

Introduction: Students will learn how important a habitat is for the livelihood of insects and other bugs. A butterfly garden will be a great resource for learning about and observing insects, butterflies and plants.

Activity: Students will help build a butterfly garden to use as an observatory for butterflies, insects and plants. Here are the steps you need to follow in order to create a butterfly garden in your school or community.

1. Research which butterflies are common in your area. Certain butterflies require certain plants.

2. Choose the location for your garden. You want to choose an area that receives a good amount of sunlight but is not a heavy traffic area. You also need an area that is accessible to water.
3. Choose host plants for the caterpillars to eat in your garden. Two examples are milkweed (it attracts Monarchs) and parsley (it attracts Black Swallowtails).
4. Choose nectar plants for the butterflies in your garden. Some examples are: butterfly bush, swamp milkweed, aster, bee balm and zinnia just to name a few.
5. Plan out your garden, use raised garden beds and soil or compost for the garden structure, purchase plants or seeds you need and go for it! Keep your garden watered and weeded along the way.

Closure: Students will take note of the process in which the butterfly garden was planted and create mini books on "How to Make a Butterfly Garden" They will use these to share with other students and practice rereading in order to increase fluency and reading skills. Students will create mini books about insect life cycles to build fluency about the different stages of a life cycle and practice reading them individually and in partners. This will not only build fluency but also increase their scientific vocabulary knowledge of butterflies and habitats.

Extension: Students can respond (in journals) to what they have learned about butterfly gardens and take notes throughout the year regarding their observations and knowledge gained on insects, butterflies and plants.

List of Materials for Classroom Use

butterfly kits, chart paper, class book materials, craft materials for attached activities, computers and internet access for research, gardening materials and tools (garden beds and topsoil), Insect Checklist, insect pictures and diagrams, life cycle art materials, plants and or seeds for a butterfly garden (host and nectar plants), read alouds on insects and butterflies, reader's theatre script, writing materials and paper (crayons, pencils, colored pencils, paints, markers, etc.).

Figure 1-Reader's Theatre Script

Reader's Theatre Script: Created from the text from the book The Very Hungry Caterpillar

There are 5 readers needed for this script

Reader 1: In the light of the moon a little egg lay on a leaf.
Reader 2: One Sunday morning the warm sun came up
Reader 3: and POP!, out of the egg came a tiny and very hungry caterpillar.
Reader 1: He started to look for some food.
Reader 5: On Monday he ate through one apple, but he was still hungry.
Reader 4: On Tuesday he ate through two pears, but he was still hungry.
Reader 2: On Wednesday he ate through three plums, but he was still hungry.
Reader 3: On Thursday he ate through four strawberries, but he was still hungry.
Reader 5: On Friday he ate through five oranges, but he was still hungry.
Reader 1: On Saturday he ate through one piece of chocolate cake,
Reader 3: One ice-cream cone,
Reader 4: One pickle,
Reader 2: One slice of Swiss cheese,
Reader 5: One slice of salami,
Reader 3: One lollipop,
Reader 2: One piece of cherry pie,
Reader 4: One sausage,
Reader 1: One cupcake,
Reader 4: And one slice of watermelon.
Reader 5: That night he had a stomachache!
Reader 3: The next day was Sunday again.
Reader 2: The caterpillar ate through one nice leaf, and after that he felt better.
Reader 5: Now he wasn't hungry anymore--and he wasn't a little caterpillar anymore.
Reader 3: He was a big fat caterpillar.
Reader 1: He built a small house
Reader 2: Called a cocoon,
Reader 1: Around himself.
Reader 3: He stayed inside for more than two weeks.
Reader 5: Then he nibbled a hole in the cocoon, pushed his way out and
Reader 4: He became a beautiful butterfly!

Figure 2-Insect Checklist

Insect Checklist

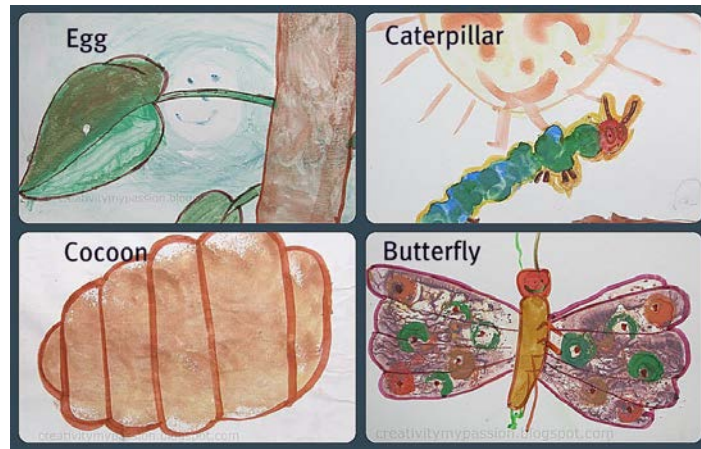


Use the checklist below to create your insect.

- _____head
- _____large eyes
- _____thorax
- _____abdomen
- _____six legs
- _____one or two sets of wings

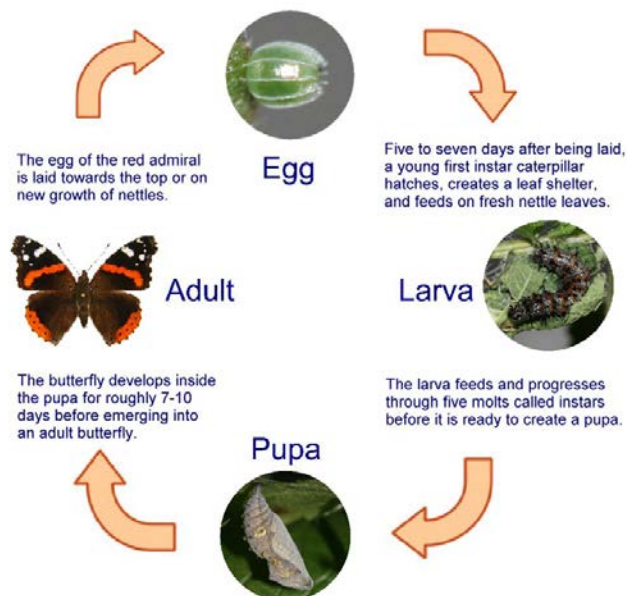
Now, pretend you are an insect and tell me what you would do.
Then, draw a picture and label a diagram of your insect.

Figure 3-Life Cycle Diagram



Example image used from:

<http://www.craftoart.com/2011/05/very-hungry-caterpillar-life-cycle-of.html?&cuid=aa9d7ae79a47e928b2c1bcada1604152>



Example image used from: <http://www.utahbugclub.org/butterflies.php>

Figure 4- Cinquain Poem

Cinquain Example

one word title	Caterpillar
2 words that describe	hungry, fat
3 action words	eating, moving, sleeping
4 feeling words	energized, alive, free
1 word that renames the title	Butterfly

Appendix I: Implementing Teaching Standards

Implementing District Standards

My unit would implement various Common Core Reading Standards for Informational Text in a significant way. The science-infused unit would incorporate reading standards as well as the North Carolina Essential Standards for science to produce an overall educational and informative unit to improve fluency and comprehension for first grade students while teaching about insects, life cycles and conservation of butterflies. Students would have the opportunity to increase their reading skills in order to develop and apply strategies and skills to read and write. Students would also develop and apply strategies to comprehend text that is read, heard and viewed in various forms of literature and informational text. Students will be exposed to the Essential Standard, Earth Systems, Structures and Processes, to prepare them for upcoming science topics in their school years.

Reading Standards for Informational Text first grade: With prompting and support, read informational texts appropriately complex for grade 1.

North Carolina Essential Standards for Earth Systems, Structures and Processes:
Summarize the needs of living organisms for energy and growth.

Reading List for Students

Bernard, Robin. *Insects*. Washington, D.C.: National Geographic Society, 2001/1999. Print.

Carle, Eric. *The Very Hungry Caterpillar*. [Rev.]. ed. New York: Philomel, 1987. Print.

DeLuise, Dom, and Christopher Santoro. *Charlie the Caterpillar*. New York: Simon and Schuster for Young Readers, 1990. Print.

McDonald, Megan, and Paul Brett Johnson. *Insects Are My Life*. New York: Orchard, 1995. Print.

Merrians, Deborah, and Norman Nodel. *I Can Read about Insects*. Mahwah, N.J.: Troll Associates, 1977. Print.

Ziefert, Harriet, and Lisa Flather. *Bugs, Beetles, and Butterflies*. New York: Viking, 1998. Print.

Bibliography for Teachers

Armbruster, Bonnie B. "Put Reading First: the Research Building Blocks for Teaching Children to Read : Kindergarten Through Grade 3" (*Jessup, MD: National Institute For Literacy, National Institute Of Child Health And Human Development, U.S. Dept. Of Education, 2001*).

This is an excellent resource for literacy instruction for teaching literacy.

Carle, Eric. *The Very Hungry Caterpillar*. [Rev.]. ed. New York: Philomel, 1987. Print.
This is a popular children's story that discusses the life cycle of a caterpillar.

Heller, Ruth. *How to Hide a Butterfly and Other Insects*. New York: Grosset & Dunlap, 1985. Print.

This is a great resource dealing with insects and camouflage.

LaBerge, David, and S. Jay Samuels. *Basic processes in reading: perception and comprehension*. Hillsdale, N.J.: Erlbaum Associates; 1977. Print.

This is a helpful tool for understanding comprehension.

Merrians, Deborah, and Norman Nodel. *I Can Read about Insects*. Mahwah, N.J.: Troll Associates, 1977. Print.

This is a great non-fiction resource about insects.

Parker, Nancy Winslow, and Joan Richards Wright. *Bugs*. New York: Greenwillow, 1987. Print.

This is a great non-fiction resource for learning about insects.

Pasternak, Carol. *How to Raise Monarch Butterflies: A Step-by-step Guide for Kids*. Richmond Hill, Ontario: Firefly Books, 2012.

This is a great resource for background information on butterflies, metamorphosis, life cycles and how to build a butterfly garden.

Pikulski, John and Shane Templeton. "Teaching and Developing Vocabulary: Key to Long-Term Reading Success", *Current Research in Reading/Language Arts (2004)*.

This resource is for learning more about teaching vocabulary in the classroom.

Tompkins, Gail E. *Language arts essentials*. Upper Saddle River, NJ: Pearson/Merrill Prentice Hall, 2006. Print.

This resource is a helpful tool for literacy information.

Turnbull, Stephanie, Rosanne Guille, and Uwe Mayer. *Caterpillars and Butterflies*. Tulsa, Okla.: Published in the USA by EDC Pub., 2003. Print.

This selection discusses the similarities and differences between caterpillars and butterflies.

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