MORPH:
Making Others Realize Phenomena Happen

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Bain Elementary

This curriculum unit is recommended for:
First and Second Grade as a Cross-Curricular Unit

Keywords: Metamorphosis, Life Cycle, Butterflies, Frogs, Plants

Teaching Standards: See Appendix 1 for teaching standards addressed in this unit.

Synopsis: This is a cross curricular based unit developed around the meaning of metamorphosis. The topics involve learning about the meaning of metamorphosis and the changes that life forms go through in different stages. This unit is presented initially by learning about basic concepts of change that later develop into more abstract information about butterflies, frogs and plants. There are various hands-on activities to promote learning about metamorphosis in butterflies, frogs and plants throughout literacy, math and science. This unit provides an opportunity for students to read, write, create, sort, collect data, graph, role-play, use technology and apply what they learn throughout the entire day across different subject areas. My objective is for other teachers to find this unit useful for teaching science topics across the curriculum. The application of this unit will create interesting and meaningful opportunities in the classroom throughout the day throughout all subject areas. The students will be able to take what they learned in one content area and apply it in the next.

I plan to teach this unit during the coming year in to 24 students across the curriculum in First Grade.

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Introduction

I have created this unit to give my first grade students a chance to work with a topic that they will be sure to take the information they have learned, share it and encounter related experiences in their very own backyard and in the big world around them. The topic metamorphosis sparked an excitement in me as a teacher that made me want to write this cross-curricular unit to share with my first grade students.

Throughout my educational journey as a student, and now a teacher, I have always had a love for being engaged in a hands-on learning experience. As a student, when one of my teachers would present a topic with a hands-on learning experience the information always seemed to "stick" better. In elementary, middle and high school the majority of the hands-on experiences I received were during my Science classes. Now as a teacher, I look for any opportunity to bring a hands-on experience to my classroom throughout all of our classroom subject areas to ensure I am meeting the need of all students.

While attending the seminar "Metamorphosis: Transformative Experience" led by Dr. Amy Ringwood, I began to realize how I could use the science concept of metamorphosis to create a cross-curricular unit to bring more hands-on experiences to my students through all subject areas. During the seminar I learned that "metamorphosis, in its purest sense, involves a larval life history stage that transforms into a very different adult form." Many things around us go through some amount of metamorphic change and I want my students to take a concrete change that they are able to observe and relate it to their academic and personal experiences moving forward.

Demographics

Bain Elementary School serves approximately one thousand students in Kindergarten through fifth grade. The school is a part of the Charlotte Mecklenburg School District and is located in Mint Hill, North Carolina. Our school is an important part of the Mint Hill community and has been for over 120 years. Bain is fortunate to have outstanding parental support and a very active PTA who take great pride in our school. The school is not very diverse with the minority enrollment at 27%, only 18% of the students qualify

for free or reduced lunch and over 20% of our students qualify for the Catalyst/Talent Development Program.

Our motto at Bain School is to challenge and prepare all students for future success. We have shown that we are committed to providing challenging opportunities to our students by consistently producing strong academic achievements and meeting standards established to promote the development of the total child. Bain has been named an Honor School of Excellence with High Growth by the North Carolina Department of Instruction for the 2008-2009, 2009-2010, 2010-2011 and 2012-2013 school years.

I am currently teaching first grade at Bain Elementary. I have taught for six years at Bain and in the Charlotte-Mecklenburg School District, five of which were in Kindergarten. My classroom is a group of six and seven year old students with varying abilities and previous experiences. The first grade team I work with consists of seven teachers and we are allotted ninety minutes of block planning to collaborate each week. We use the North Carolina Common Core standards for Literacy and Math and the North Carolina Essential Standards for Science and Social Studies to guide our instruction. I teach reading, writing and math daily along with 45 minutes of science or social studies depending on the day. I use a variety of teaching methods to ensure I meet the needs of all students in my classroom. It is very important in my classroom for the students to have the opportunity to get a hands-on experience. I use a range of research based literacy teaching methods throughout my day and integrate all of my subject areas as much as possible. Throughout literacy and math I use flexible grouping to differentiate student instruction based on individual needs. In my classroom I have eleven iPads, one computer, a mounted projector and a document camera and wifi. In addition to this technology we have a subscription to DiscoveryEd.com, Scholastic Weekly News online, DreamBox and Raz Kids. This technology opens up an array of options for my students to research, communicate, to create, and to explore. With the use of technology my classroom is a balance between teacher directed and student led activities.

Rationale

This cross-curricular unit is intended for first graders to help master skills in reading, writing, math, social studies and science. This unit will be based on understanding the concepts of metamorphosis and how many things change throughout their different stages over time; specifically on the metamorphic changes in butterflies, frogs and plants from a larval form to an adult stage. One key focus at my school is vertical team planning and collaborating with other grade levels to make certain that our students are being challenged and prepared for future success. This unit was created to build a solid foundation and understanding of the word metamorphosis for their ongoing journey in education and science.

During the unit students will be exposed to several activities, classroom strategies and hands on experiments in order to fully explore the concept of metamorphosis. This unit will begin with an introduction to the concept of the word change and will focus on topics based on the following questions:

1. What does the word change mean? Do people change over time and if so how? What are some things that change over time?
2. What does the word metamorphosis mean?
3. How is the butterfly's metamorphic change similar and different from the frogs?
4. Do plants go through metamorphosis? How do you know?
5. What do butterflies, frogs and plants need to successfully go through metamorphosis? What if one of their needs was no longer available to them?

At the end of this unit, students will have had exposure to the metamorphosis concept throughout all content areas with a variety of opportunities for hand-on experiences, comprehension and writing instruction, comparing and contrasting, collecting data, interpreting information and data, etc. All of these will contribute to overall elements of improved cross-curricular skills through exposure to new vocabulary and new information as well as collaboration with peers. My unit "MORPH: Making Others Realize Phenomena Happen" will build a foundation for my students in their future explorations of metamorphosis and change in their lives.

Objectives

Throughout this metamorphosis unit I will be teaching my entire class of first graders about the meaning of metamorphosis throughout all subject areas. The students will be expected to be engaged in class discussions, assignments, team work, research, hands on projects and exploring. I pace my science units according to the CMS yearly pacing guides, therefore I will implement this unit in my classroom during the fourth quarter. The fourth quarter of the school year is during the Spring season and will closely relate to all of the changes we will be learning about.

Background Information

A phenomenon is an *occurrence or circumstance observed or observable. Often it is something that is impressive or extraordinary.* There is metamorphosis going on around us all of the time and we need to stop and *study the phenomena of nature.* The incredible changes we see in nature are not magic but metamorphosis.

Metamorphosis is *the process of transformation from an immature form to an adult form in two or more distinct stages.*

Different life forms go through different numbers of stages of metamorphosis. There are two types of metamorphosis. In incomplete metamorphosis, the changes are more gradual, and is typically composed of three stages (embryo, nymph, adult). Complete metamorphosis involves more dramatic changes and can have four or more stages, sometimes with multiple larval forms before finally metamorphosing into an adult.

Metamorphosis is more common in insects and is controlled by their hormones. Butterflies and moths are insects that go through complete metamorphosis which has four stages, the egg, larva, pupa and adult stages. In the larva stage, commonly known as caterpillars, they eat a lot and therefore grow a lot. The larvae are covered by an exoskeleton, so in order to grow, they must periodically shed this outer covering, a process known as molting. A larva molts multiple time while it is in this stage. The caterpillar then transforms into the pupa stage, and often builds a protective casing like a chrysalis. While inside this casing the pupa is developing its adult body parts. When it comes out of the protective casing the insect is now in its adult form. Some examples of insects who go through complete metamorphosis are butterflies, moths, beetles, flies, and wasps.

Other insects, like grasshoppers and termites, go through incomplete metamorphosis which means they go through three stages with more gradual changes. The three stages are the egg, the nymph and the adult. The nymph stage is the eating stage. The nymph stage can look a lot like the adult stage just smaller and without their wings. During the nymph stage the exoskeleton must be molted periodically so they can grow. The nymphs of the different molt periods are called instars. During the instars you will noticed the nymphs are looking more like the adult form as they are forming and growing wing buds. Finally the last instar nymph molts into the adult form, will grow full wings and lay eggs to start the life cycle all over again.

Metamorphosis does not only happen to insects. A lot of amphibians also go through metamorphosis. One of the most commonly known amphibians that go through metamorphosis is a frog. A female frog produces eggs that hatch out as tadpoles. The tadpole will gradually develop its legs and lose its tail to metamorphose into an adult frog. The adult frog will lay eggs and start the life cycle all over again.

Many marine and freshwater invertebrates such as starfish, crabs, lobsters, snails, and clams also go through metamorphosis, and produce an array of very strange-looking larval forms.

By definition, metamorphosis is *the process of transformation from an immature form to an adult form in two or more distinct stages, so p*lants go through metamorphosis as well, even though this term is not commonly used for plant life cycles. In plants, metamorphosis refers to the transformation from a young non-reproductive plant to a

reproducing plant – a phenomenon that is marked by the production of flowers and seeds, and then the life cycle starts all over again with the seeds.

Metamorphosis is happening all around us in nature in many different life forms. Phenomena do happen!!

Strategies

Below are the strategies I will use throughout my cross-curricular unit:

Science Journals

Journals provide the students with the opportunity to record what they have learned through daily writings and or drawings. This allows the teacher to assess whether or not the student is understanding the concepts that are being presented in class. The students will keep a science journal to record observations and new vocabulary words, answer posed questions, make predictions and summarize what they have learned.

K-W-L Chart

K-W-L charts, which tracks what a student already knows, what they want to know and at the end of the unit what they have learned. It allows the teacher to grasp an understanding of what her students' prior knowledge of the concept is and it encourages students to pose questions about the topic. At the end of the unit the children are able to list what they learned about the topic from their classroom activities. We will complete the K-W-L chart as a class in a group setting on the carpet to begin and end our unit.

Interactive Read Aloud

While the class is in a whole group at the carpet enjoying an interactive read aloud they will be required to use multiple literacy skills. We will be using fiction and non-fiction stories while displaying this strategy. Students will be engaged by actively thinking about the story, listening, speaking, role-playing and writing (stop and jot or reading response). In this unit there will be an interactive read-aloud across all subject areas.

During the interactive read alouds the teacher will be modeling think alouds, which means they will be verbalizing out loud about something they have noticed or they have learned from what they are reading. This helps the students to see how good readers get information or ideas from a text.
The students will also be given many opportunities to turn and talk with a neighbor during interactive read alouds at the carpet discuss new vocabulary words in a books, make predictions, answers questions or summarize the book.

Depending on the story the students will either stop or jot or at the end of the story answer a posed question through a reading response. A stop and jot can be done on a post it note, note card or in a notebook. A stop and jot takes place sometime during the book when the teacher stops reading and ask the students to record something (whether it be an answer, a picture or make a prediction).

Venn Diagram

A Venn diagram allows the students to compare and contrast two topics. When using a Venn diagram you write the topics differences in the two outer circles and you write the similarities in the overlapping part of the circles. In this unit the students will be sitting in a circle on the carpet and they will have two hula hoops overlapping in the middle of the carpet. The students will have prepared facts about the metamorphic changes of a butterfly and frog and they will need to sort the facts where they belong into the different areas of the Venn diagram made by hula hoops.

Graphing

Graphing organizes data recorded by the students to help them better understand their information. The students will graph how many days each life form is in each stage.

Cause and Effect

Cause and effect helps explain why things happen the way they do. During our social studies time the students will be answering the following questions: What do butterflies, frogs and plants need to successfully go through metamorphosis? What if one of their needs was no longer available to them? They will need to consider the following question - if we take something the living thing needs to change away from them, what will the effect be, and will these factors affect certain species more than others? For example: monarch butterflies are picky eaters and prefer to eat milkweed compared to other butterfly species that are generalist that will eat just about anything.

Hands – On Learning

“Hands-on learning is learning by doing. Vocational education has always understood that if you want someone to learn to repair an automobile, you need an automobile to repair. If you want to teach someone to cook, you put them in a kitchen. Whoever heard of teaching someone to swim in a traditional classroom? Likewise, I do believe that in order to truly teach science, we must "do" science.” *Jeff G. Brodie, fifth and sixth grade teacher, East Side Elementary, Edinburgh, IN*
http://www.ncrel.org/sdrs/areas/issues/content/cntareas/science/eric/eric-1.htm
Hands-on learning is an important role in how this unit it constructed. The students will have hands-on experiences throughout all subject areas. A few things that will

incorporate hands-on learning are as follows: There will be a cup of caterpillars and a frog hatchery for the students to observe and explore in the classroom (ordered from insectlore.com) and the students will plant a garden out of the backdoor of the classroom with flowers that are likely to attract butterflies (zinnias, butterfly bushes). They will be creating projects to display the different stages of the life cycle and drinking "nectar" with a rolling straw to show how butterflies eat. They will draw and create models of caterpillar jaws to think about how they tear and chew plants. Therefore in addition to the living observations, they will learn that the adults and larvae eat different things, as well as what and how they eat.

Role-Playing

Role-playing provides the students with the opportunity to take on the role someone or something else to try and understand the perspective from a different view other than their own. The students will be roll-playing the changes of a butterfly, frog or plant and try to move like their different stages to see firsthand how different they are in each stage.

Technology

Technology overflows into nearly every part of our everyday lives through cell phones, iPads, computers, projectors and much more. With the abundance of technology available to us it is necessary to incorporate it into our everyday classroom activities and this unit. I will utilize our classroom iPads, projector, apple TV and document camera to engage the students and provide them with factual information and pictures. In addition, I will use our subscription to DiscoveryEd.com to share videos on the life cycle of a butterfly, frog and plant.

Classroom Activities

This unit is intended to be used throughout all subject areas. The teacher should use an array of nonfiction and fiction books for children on butterflies, frogs and plants. A great list to reference when choosing books to go with an activity or to have displayed in the classroom for the children to read can be found on the reading list for students under resources. The activities to use throughout this unit are below and are organized by the subject area.

Literacy

Literacy Activity #1 - Frog, Butterfly and Plant KWL Chart

Objective: The students will fill out the K and W on the frog, butterfly and plant KWL charts as a group.

Materials

Group KWL Chart Worksheets (See Figure #1, 2 and 3), Prepared KWL Charts on Chart, Paper (Create Figure #1, 2 and 3 on Large Chart Paper), Frog, Butterfly and Plant Photos, Markers, 3 Preselected Groups

Procedure

The teacher will show a picture of a frog, butterfly and plant and ask the students to think about what they already know about these three things. The teacher will explain that she is going to break them up into three different groups and have them work on a KWL chart for all three living things. As a team the students will use their prior knowledge of these living things and of KWL charts to add what they already know to the K section and questions about what they want to know under the W section. The teacher will then collect them and combine what the groups came up with on a chart paper sized KWL chart. These charts will help guide my cross-curricular unit to show me what the students already know and what areas I need to dig deeper throughout my unit.

Literacy Activity #2 - Fact vs. Opinion Scavenger Hunt

Objective: The students will review facts about butterflies, frogs and plants by completing the fact vs. opinion scavenger hunt and sorting out the two groups as a class. The students will also be able to determine the difference between a fact and an opinion.

Materials

Butterfly, Frog and Plant Fact and Opinion Cards (See Figure #4), Chart Paper to Sort the Fact and Opinion Cards

Procedure

The teacher will review the directions to successfully complete the scavenger hunt. The students will look around the room to find one fact or opinion card. After finding one fact or opinion card the students will walk back to the carpet and begin to read their card silently to themselves. They will need to find out if their card states a fact or an opinion. When given a turn each student will read their fact or opinion card aloud to the class and tell the class where they would like to place their card on the chart paper. The students may place their card under the fact or opinion side of the chart paper. After the student has read their card aloud and shared whether they think it is a fact or an opinion the class will give them a thumbs up if they agree or a thumbs down if they do not agree. This will allow the class to have an opportunity to be actively engaged with the cards their classmates found and it is a good informal assessment check for the teacher to see if the other students are understanding the difference between a fact or an opinion.

Literacy Activity #3 - Frog vs. Butterfly Venn Diagram

Objective: The students will compare and contrast the similarities and differences between a frog and a butterfly.

Materials

Two Hula Hoops, Post-it Notes, Venn Diagram Worksheet (See Figure #5), Nonfiction Children Books on Butterflies and Frogs (See Reading List for Students under Resources)

Procedure

The teacher will provide students with an array of nonfiction children's books on butterflies and frogs that are available to the students during literacy workshop time. The students will have these books available to them during workshop time throughout the entire cross-curricular unit. After a few days of reading books about frogs and butterflies during read to self time the teacher will add a new task before sending them to their bubble/safe spots. Throughout the provided time for read to self during literacy workshop the students will be rereading books that they have already been exposed to and writing down facts they find on post it notes. They will only write one fact per post it note. When the read to self timer goes off the students will clean up and bring their post it notes back to the carpet and sit in a circle around the two hula hoops. The hula hoops are overlapping in the shape of a Venn diagram with a picture of a frog on top of one and a picture of a butterfly on top of the other hula hoop. The students will go around in a circle and read the fact/facts they found in the books they were reading and determine if it is a fact about butterflies, frogs or both. They will need to place their post-it note in the appropriate section of the Venn diagram. The students will need to finish out this activity by going back to their seats and filling out their own Venn diagram that has at least two facts in each section to formally assess that the students know what some similarities and differences are of a frog and butterfly.

Writing

Writing Activity #1 – Facts, Facts, Facts: Creating a Nonfiction Book based off Research

Objective: After students complete their research using nonfiction children's books and the internet, the students will create a nonfiction book using at least 4 nonfiction text features on the Story Creator Application.

Materials

Research Paper (See Figure #6), Internet Access, iPads with the Story Creator Application, Nonfiction Children Books on Multiple Metamorphic Species (See Reading

List for Students under Resources), Nonfiction Text Feature Assessment Checklist (See Figure #7), Bookmarked Websites and Dicoveryed.com Videos

Procedures

The teacher will conduct this project after the students have a reasonable of what the word metamorphosis means. The teacher will have already taught the differences between a nonfiction and fiction story and what text features are included in a nonfiction book. The teacher will bookmark appropriate websites and gather children friendly nonfiction books for research. The students will first need to get with their partner and choose a life form that goes through some type of metamorphosis. The students will work with a partner to explore the bookmarked websites on our classroom iPads or in the computer lab and read through the provided books in the classroom or library to find information on their topic. They will use the provided metamorphosis research worksheet to help guide their note taking. When the partners have decided they have found enough information to create a nonfiction book they will then move onto creating their nonfiction books on the Story Creator applications on the iPads. Note: If they have not previously used this application there will be step by step directions shown to the whole class over the AppleTV before the students begin the book process. Once the groups finish their nonfiction book they will present their book to the class on the project using the AppleTv. They will be graded on their work using the nonfiction text feature checklist.

Writing Activity #2 – Writing a Fiction Story with an Imaginative Metamorphic Character

Objective: After students complete their nonfiction books with a partner, the students will create a fiction story about a made up life form that goes through metamorphosis at their writing center. The students will make up how the life form changes and what they change into.

Materials

Writing Paper, Crayons/Markers/Colored Pencils

Procedure

The teacher will conduct this project after the students have a reasonable understanding of what the word metamorphosis means and the different stages life forms go through. The teacher will have already taught the differences between a nonfiction and fiction story and the students will have completed creating a nonfiction book. The teacher will provide the necessary materials at the writing center table so they are readily available for the students when they arrive. This activity will not be completed all at once because it is in a writing center. The teacher will give the directions to the whole group and what is

expected of the students when they get to the writing center and provide an example of a teacher created metamorphic character. When the students have center time when they get to the writing center they will get a piece of writing paper, draw their character and write their story to go along with their illustration. When they are completed with their story they may turn it into our completed center work basket. The stories will be turned into a class book and then shared with the class. The class book will be placed in our class book basket in our book nook.

Math

Math Activity #1 – Symmetry in Nature

Objective: The students will create a butterfly that is symmetrical.

Materials

Half of a Butterfly Outline Cutout on Cardstock (May have multiples to get an array of different butterfly outlines), Clipboards, Writing Paper, White Construction Paper, Scissors, Paint, Children's Symmetry Books (See Reading List for Students under Resources)

Procedure

The teacher will begin by introducing the word symmetry/symmetrical to the students. . As a class we will define the word symmetry and make a list of things that we know have symmetry. The teacher will read the book What Is Symmetry in Nature? (Looking at Nature) by Bobbie Kalman and have the other symmetry books on display for the children to read at another time. After we read the story we will add any new things to our list that we learned about in the story. We will go outside on a symmetry nature hunt to see if we can observe anything with symmetry outside of our classroom for ourselves. The students will take clipboards and paper with them to list anything they may observe on our symmetry nature hunt. When we come back in from outside we will turn and talk with a partner to share what we observed outside. The teacher will tell the students they are going to make something with symmetry in class. The teacher will show them half of a butterfly and have them guess what they will be making. The students will fold their white construction paper in half, trace around the half of a butterfly outline, cut on their line and then open up their white paper to see if they were right. After the students have successfully cut out their butterfly with symmetry we will add color to their wings with paint. To ensure that the wings colors will also be symmetrical have the students place small drops of different color paint onto one wing. After they have finished placing the pain on the wing have the students fold their butterfly back in half and squish the paint in between the two wings. Carefully have the students pull the wings apart to see the beautiful symmetrical design and lay them flat on their desk to dry.

Math Activity #2 – Graphing Data

Objective: The students will collect data and create a graph with the information they have collected. The students will use the information on the graph to compare and contrast the metamorphic changes they see firsthand in class.

Materials

Live Butterfly Garden (www.insectlore.com), Frog Hatchery Kit (www.insectlore.com), Student Made Greenery (See Science Activity #1), Science Journal, Butterfly, Frog and Plant Graphing Sheet (May be a line, bar or pie graph depending on your students)

Procedure

The teacher will order the live butterfly garden and frog hatchery kit from www.insectlore.com and the students will have already made their greeneries. The teacher will get all of materials set up in a designated spot that they students will be able to see and observe each day before beginning the study. The teacher will set aside a specific time for the students to record what stage of the metamorphic process the butterfly, frog and plant are in each day. The students will need to decide how they are going to record how long each life form stays in a specific stage. They may use tally marks, pictures, numbers or a strategy they come up with on their own that works best for them. The students will record their data in their science journal. They will then transfer their information onto a graphing worksheet and compare and contrast what they see between the three life forms.

Science

Science Activity #1 – Does the life form really need certain factors?

Objective: The students will investigate how different factors could affect the changes in a plant by altering one need.

Materials

Carnations, Vases, Food Coloring, Water, Shoe Box, Science Journal

Procedure

The teacher will have already done a lesson on what living things need. The teacher will refer back to their prior knowledge of what living things need and have the students share why living things need certain things. The teacher will show the carnations and ask

questions like: “What would happen if this flower did not have all of its needs? What do you predict would happen if this flower did not have water? What if this flower did not have sunlight? What if we changed one of its needs? What if we changed the color of this flowers food?” The students would be expected to share their answers to the questions and make predictions in their science journal. The teacher would set up a station with one flower in a vase with water in the sunlight, another flower in a vase with no water but in the sunlight, a flower in a vase with water but no sunlight (in a box) and a flower in a vase with colored water and sunlight. The students will observe and take notes over the following days and record what they found out. Depending on the time of year you teach this lesson the teacher may choose to extend on this experiment and closely relate this to taking about Earth Day and how we need to remember to reduce, reuse and recycle or the living things around us may be affected.

Science Activity #2 – Metamorphic Plants

Objective: The students will create a greenery for their seed to watch the plant change during its life cycle.

Materials

Seeds (sunflower seeds are a good option), Sandwich Sized Ziploc Bags, Paper Towels, Spray Bottle, Stapler, Sunlight, Window Crayons, Clear Plastic Cups, Soil

Procedure

The teacher will read From Seed to Plant by Gail Gibbons to start out the discussion on plants and what they need to grow. As a class we will list things that seeds need to be able to grow on the board. The students will each get a Ziploc bag, three seeds and one paper towel. The students will fold their paper towel in fourths to fit inside of their Ziploc bag. The teacher will come around and staple three staples halfway up the bag horizontally securing the paper towel in place. The students will place one seed on top of each staple and then spray the inside of their bag until the paper towel is completely moist. The students will then zip up their bag and tape it onto the inside of the window. They will write their name above their bag with a window crayon. After the students have observed their seed sprout they will transfer their sprout and roots to a cup of soil. The students will need to water them and watch them grow. When the unit is over the students will be able to take their plant home and plant it in their yard.

Science Activity #3 – Journaling

Objective: The students will keep a journal to record what they observe each day as they watch the butterflies, frogs and plants grow and change. They will record new vocabulary words as they are addressed throughout our unit.

Materials

Live Butterfly Garden (www.insectlore.com), Frog Hatchery Kit (www.insectlore.com), Student Made Greenery (See Science Activity #2), Science Journal

Procedure

The teacher will order the live butterfly garden and frog hatchery kit from www.insectlore.com and the students will have already made their greeneries. The teacher will get all of materials set up in a designated spot that they students will be able to see and observe each day before beginning the study. The teacher will set aside a specific time during the science block or morning work for the students to record the different changes they are seeing each day. Throughout the unit as a class they will add new vocabulary to their journals.

Science Activity #4 – Egg Carton Caterpillar

Objective: The students will make an egg carton caterpillar to show one of the stages of the butterfly's life cycle.

Materials

Egg Carton, Googly Eyes, Pipe Cleaners, Paint, Glue, Markers, Pom Pom Balls (optional)

Procedure

The students will each pick a type of caterpillar they would like to make their egg carton into. The teacher will provide the precut strips of the egg carton for each student. The student will need to paint the egg carton strip the appropriate color to match the specific caterpillar they would like to make. The students will then glue on the googly eyes, the pipe cleaners for antennae and legs and then add any other details they made want or need.

Science Activity #5 – Life Cycle Mobiles

Objective: The students will create their own mobile life cycles on the life form they choose.

Materials

Construction Paper, Paper Plate, Notecards, String, Markers, Scissors

Procedure

After the metamorphosis unit has been taught and the students have learned about the similarities and differences of how life forms change they will choose either a butterfly, frog or plant and create a life cycle mobile. The students will each get one paper plate which they will cut into a spiral. The students will draw the different stages of metamorphosis that their life form goes through on a piece of construction paper and cut them out. The students will write about each stage on a separate notecard and glue it to their picture of that stage. The students will hang each stage in order from a string off of their spiral plate. The life cycle mobiles will be displayed in class.

Science Activity #6 – Role Playing
Objective: The students will act out the life cycle of a butterfly with their body changing into different positions. They will sip "nectar" from a cup with a straw to demonstrate how the proboscis works.

Materials:

Flex Straws, Flower Cut Outs, Cups, Sugar Water

Procedure

The teacher would have the students spread into their own spots around the classroom. The students would curl up into a ball and be very still to mimic the egg stage of a butterfly's life cycle. The teacher would instruct the students to munch their way out of their egg and pretend to be a very small caterpillar eating their host plant. They would gradually get longer and longer the more they eat in their larval form and move without using their hands or feet. To have the students simulate molting during the larval stage the students could wrap up in layers of scarves and take them off one by one as they grow into a bigger caterpillar. The students would then stand up with their hands inside of their shirt to act out the pupa stage. They will be very still on the outside but changing on the inside. They would be reminded to sometimes shake gently like we see the chrysalis doing. When they crack out of the chrysalis into their adult form they will have a difficult time moving them because they will pretend their wings are still wet. We will stand there and move our wings slowly to represent the time when the butterflies are drying their wings. Then we will fly around the room like a butterfly flapping our wings. After we are in the adult form the students will go back to their seats and act out how a butterfly sucks nectar from flowers. This is a great time to talk about the butterflies body parts. The teacher will provide cups with sugar water. The cup will have a cutout of a flower laying over the top and a straw going through the middle of the flower. The butterfly's proboscis rolls in and out to allow the butterfly to sip nectar so it is highly recommended to use the flexible straws to have the students roll and unroll the straw like the proboscis.

Science Activity #7 – Classroom Garden

Objective: The students will work together to grow a garden.

Materials

Classroom Garden Bed, Seeds, Soil, Water, Sunlight

Procedure

As a class the students and teacher will decide on what they would like to grow in their garden. The students will plant the seeds and make sure the seeds are getting what they need each day. The student will be able to watch the life cycle of a plant while it grows in their garden.

(Figure 1)

Names: _____

Date:_____

K What we already know about a butterfly.	**W** What we want to know about a butterfly.	**L** What we learned about a butterfly.

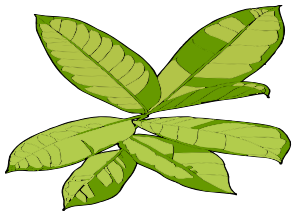
(Figure 2)

Names: _____

Date:_____

K What we already know about a frog.	**W** What we want to know about a frog.	**L** What we learned about a frog.

(Figure 3)



Names: _____

Date:_____

K What we already know about plants.	**W** What we want to know about plants.	**L** What we learned about plants.

(Figure 4)

Butterfly, Frog and Plant Fact and Opinion Cards

Butterflies are pretty.	A frog can live both on land and in water.	Butterflies often have brightly colored wings with unique patterns made up of tiny scales	There are over 200,000 identified plant species and the list is growing all the time.	Butterflies have four wings.
I want to grow a plant.	A caterpillar is an example of a larval stage of metamorphosis.	Frogs use their sticky, muscular tongue to catch and swallow food.	Butterflies are insects.	I want a frog as a pet.
Most caterpillars are plant eaters (herbivores).	Caterpillars are nicer than worms.	Most butterflies feed on nectar from flowers.	Frogs lay their eggs in water.	Molting means to shed the outer covering.
Frogs all look the same.	A frog is slimy and disgusting.	Around 2000 different types of plants are used by humans to make food.	Seeds are cool.	Scientists estimate that there are between 15000 and 20000 different species of butterfly.
A butterfly's lifecycle is made up of four parts, egg, larva (caterpillars), pupa (chrysalis) and adult.	Instead of drinking water, frogs soak it into their body through their skin.	Frogs are cute.	People should not collect butterflies.	Plants are interesting.
The frog eggs hatch into a tadpole which lives in water until it metamorphoses into an adult frog.	I hope some butterflies don't go extinct.	Frogs are amphibians.	Butterflies attach their eggs to leaves with a special glue.	Frogs can see forwards, sideways and upwards all at the same time. They never close their eyes, even when they sleep.

(Figure 5)

Name: _____

Date: _____

Frog vs. Butterfly Venn Diagram

Both

(Figure 6) Name:_____ Date:_____

Metamorphosis: Facts, Facts, Facts

My metamorphic life form is:

My life form eats:

My life form goes through _____

metamorphic stages.

My life form goes through:

(circle one)

Complete Metamorphosis

Incomplete Metamorphosis

The stages my life form goes through are:

My life form looks like this during each stage:

Two interesting facts I learned about my life form are:

1. _____

2. _____

(Figure 7)

Name: _____ Date: _____

Nonfiction Text Feature Checklist

Place a check in the boxes that are included in the student's nonfiction book.

- ☐ Table of Content
- ☐ Photographs
- ☐ Title Page
- ☐ Heading
- ☐ Caption
- ☐ Bold Text
- ☐ Key Words
- ☐ Map
- ☐ Chart
- ☐ Diagram
- ☐ Illustration

_____/ 11

Comments:

_____

_____

Appendix: Implementing Teaching Standards

This unit incorporates first and second grade Common Core Standards for Literacy and Math as well as the North Carolina Essential Standards for Science. It is a cross curricular unit that covers standards from multiple core content areas. All of these standards will be incorporated throughout the unit, relying on each other for the successful completion of this cross curricular unit. The students will demonstrate an understanding through journaling, writing, creating, drawing conclusions, etc.

CCSS.ELA-LITERACY.W.1.3 Students will write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure. The students will write a fiction story in their writing center in which they create a made up life form that goes through metamorphosis.

CCSS.ELA-LITERACY.W.1.6 With guidance and support from adults, students will use a variety of digital tools to produce and publish writing, including in collaboration with peers. The students will work with a partner to research and create a nonfiction book about a life form that goes through metamorphosis on the iPad using the app Story Creator.

*CCSS.MATH.CONTENT.1.MD.C.4 Students will organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.*The students will be keeping a record on how many days each life form is in each stage. We will graph this data as a class and compare and contrast what we notice.

2.L.1 Understand animal life cycles. 2.L.1.1 Summarize the life cycle of animals by: Birth, Developing into an adult, Reproducing, Aging and death. 2.L.1.2 Compare life cycles of different animals such as, but not limited to, mealworms, ladybugs, crickets, guppies or frogs. Students will focus on the metamorphic changes that butterflies and frogs go through. Students will investigate the similarities and differences between the two through books, iPads, Discovery Ed videos and watching the butterflies and frogs grow and change in the classroom.

Overall Standard 1.L.2 Summarize the needs of living organisms for energy and growth. The students will focus on how plants also go through changes and what they need for those changes to be able to happen. The students will investigate what factors could affect those changes in a plant from happening by altering one factor.

List of Materials for Classroom Use

To complete any or all of the activities in this cross curricular unit you will need to gather and prepare an array of materials for you and your students to use. You may find the list of materials you will need for each activity under the activity you choose to use in this unit.

Reading List for Students

The teacher may choose to use some of the books listed below to guide their instruction throughout their activities.

Bobbie, Kalman. *What Is Symmetry in Nature?*

Brownlie, Betty. *Life Cycle of a Frog*.

Burris, Judy, and Wayne Richards. *The Life Cycles of Butterflies: From Egg to Maturity, a Visual Guide to 23 Common Garden Butterflies*. North Adams, MA: Storey Pub., 2006.

Carle, Eric. *The Tiny Seed*. Natick, MA: Picture Book Studio :, 1987.

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

Gibbons, Gail. *From Seed to Plant*. New York: Holiday House, 1991.

Heiligman, Deborah, and Bari Weissman. From Caterpillar to Butterfly. New York: HarperCollins, 1996.

Ingram, Mike. *A Frog's Life Cycle*.

Jordan, Helene J., and Loretta Krupinski. *How a Seed Grows*. Rev. ed. New York: HarperCollins Publishers, 1992.

Marsh, Laura F. *Caterpillar to Butterfly*. Washington, D.C.: National Geographic, 2012.

Pfeffer, Wendy, and Holly Keller. *From Tadpole to Frog*. New York: HarperCollins, 1994.

Bibliography for Teachers

The websites below are great resources to use to look up facts, pictures and videos to help guide instruction throughout this unit during the activities. The students may also use some of these websites to find facts to write in their nonfiction books.

"ALL ABOUT FROGS FOR KIDS AND TEACHERS." All about Frogs for Kids and Teachers. Accessed November 23, 2014. http://www.kiddyhouse.com/Themes/frogs/.

Britannica Online for Kids, s.v. "metamorphosis," accessed November 4, 2014,http://kids.britannica.com/elementary/article-9390072/metamorphosis.

"Frog Facts - Habitat, Amphibian, Wild, Tadpole, Interesting Information." Frog Facts - Habitat, Amphibian, Wild, Tadpole, Interesting Information. Accessed November 23, 2014. http://www.sciencekids.co.nz/sciencefacts/animals/frog.html.

"Fun Butterfly Facts for Kids - Interesting Information about Butterflies." Fun Butterfly Facts for Kids - Interesting Information about Butterflies. Accessed November 23, 2014. http://www.sciencekids.co.nz/sciencefacts/animals/butterfly.html.

"Fun Plant Facts for Kids - Trees, Flowers, Photosynthesis, Weird Species." Fun Plant Facts for Kids - Trees, Flowers, Photosynthesis, Weird Species. Accessed November 23, 2014. http://www.sciencekids.co.nz/sciencefacts/plants.html.

"Insect Lore." - Live Caterpillars, Butterflies, Insects and Gifts. Accessed November 23, 2014. http://www.insectlore.com/.

"Metamorphosis." Metamorphosis. Accessed November 23, 2014. http://exhibits.pacsci.org/insects/metamorphosis.html.

"The Butterfly Site - The #1 Butterflies Information Source." The Butterfly Site - The #1 Butterflies Information Source. Accessed November 23, 2014. http://www.thebutterflysite.com/.

"Watch Now: NOVA | The Incredible Journey of the Butterflies | PBS Video." PBS Video. Accessed November 23, 2014. http://video.pbs.org/video/1063682334/.

"Welcome to Discovery Education | Digital Textbooks and Standards-aligned Educational Resources." Welcome to Discovery Education | Digital Textbooks and Standards-aligned Educational Resources. Accessed November 23, 2014. http://www.discoveryeducation.com/.