Young Florida Naturalists

SEED Grant Final Report

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This project focused on three goals. The first goal was to increase young children’s knowledge of plants and their role in the environment. The second goal was to introduce scientific learning through hands-on instructional experiences. The third goal was to examine the utility of concept mapping as a tool to track concept development in young children (three- and four-year-olds) and is, therefore, focused on how young children learn. Through these goals the proposed project addressed a city-wide goal to have all students arrive at kindergarten “ready to read, ready to learn, and ready to succeed.”

The objectives and hypotheses of the project were the following:

**Objectives:**

- Enable young children to correctly identify concepts and their hierarchical relationships by providing environmental experiences with plants.

- Enhance vocabulary development and language expansion of young children by reading aloud selected children’s books to them.

- Help children develop concept maps based on their statements about plants and the environment.

- Help scaffold children’s thinking about plants and their relationship to the environment by providing advance organizers as an instructional tool.

- Help young children develop conceptual thinking by providing opportunities to develop concept maps using word/picture cards.

**Hypotheses:**

Young children will not be able to articulate the hierarchical relationships among the concepts related to plants and their role in the environment.

Young children will not be able to construct a concept map that includes second or third level concepts, related to plants in the environment.
Participants and Context:

The Young Florida Naturalists project focused on increasing the background knowledge and concept development of 3- and 4-year-old children (n = 53) enrolled in three classes at the Don Brewer Early Learning and Professional Development Center. This study built on the work of Novak & Gowin (2004), Zimmerman (2005), Hirsch (2006), and Neuman & Celano (2006) regarding concept mapping, elementary science learning, and the knowledge gap of at-risk, young children. Learning experiences involved plants and their role in the environment. Instructional activities included advance organizers or statements of scientific beliefs to guide the children’s investigations. Investigations included activities such as determining the effects of water, sunlight, air and soil on plant growth. Building background knowledge was emphasized as the children engaged in concrete experiences with plants in a butterfly garden developed on the center’s grounds. Vocabulary development was emphasized through read aloud activities based on environmental books purchased with grant funds. Concept mapping was used to document the hierarchical relationships described by the children before, during, and after learning experiences had been initiated.

Results:

Objective 1: Enable young children to correctly identify concepts and their hierarchical relationships by providing environmental experiences with plants.

Objective 1 was addressed through the following purchases of materials and activities: a) classroom manipulative materials related to plants and butterflies; b) children’s non-fiction books about plants and butterflies; c) experiments with live plants; d) planting a butterfly garden; e) observing the butterfly life cycle/butterfly release.

Dr. Tony Rossi, Associate Professor of Biology at the University of North Florida, was the advisor to our project. He visited the Brewer Center to see what areas were available for the butterfly garden and provided a list of native plants suitable for attracting butterflies.

To prepare children for the actual experience of planting and caring for a butterfly garden, the three teachers conducted classroom experiments that demonstrated that plants need water, air (CO₂), soil (nutrients), and sunlight. The children also planted beans (seeds) in cups so they could learn about roots, stems, and leaves. Another activity focused on the stem and its function to transport water and nutrients to the leaves and flowers. Carnations and colored water were used to illustrate the function of the stem. The unit design and learning activities are provided in Appendix A.

In addition to the above-mentioned learning activities, families were invited to attend the 6th Annual Butterfly Festival at Tree Hill on April 28. Eight families were able to participate in the festival activities.
Objective 2: Enhance vocabulary development and language expansion of young children by reading aloud selected children’s books to them.

The teachers collaborated with FIE staff to select non-fiction books appropriate to the children’s developmental levels. Each classroom received 26 books related to plants and butterflies. The books were used to implement the lessons as detailed in the unit plan (see Appendix A).

Vocabulary and concept cards were identified for the weekly lessons. The transcripts of the children’s statements during each assessment reflected the new vocabulary the children learned, such as soil, stem, nutrients, chrysalis, tap root, and fibrous root.

At the conclusion of the instructional period, a family event was conducted. Families were invited to see children demonstrating activities that were included in a take-home packet, as well as view a PowerPoint presentation with pictures taken during the project’s implementation. The demonstrations were held twice, once during the morning drop-off time and the other during the afternoon pick-up time to accommodate parents’ work schedules. Parents were provided with a packet of materials, books, and activity suggestions, along with plants to start a garden at home. The purpose of the take-home packet was to enable parents to read to their children thereby reinforcing the vocabulary and science concepts the children learned. See Appendix B for pictures of the contents of the take-home packet.

Objective 3: Help children develop concept maps based on their statements about plants and the environment.

The three teachers constructed initial concept maps with the children in their respective classes. The teachers read two books, *The Butterfly Life Cycle* and *Green and Growing*, to stimulate the children’s thinking. The concept maps were posted in the classrooms. Final concept maps were constructed with the children’s input prior to Assessment 3. The initial and final concept maps for each class appear in Appendix C.

The final class concept map was used with the children for Assessment 3. The Assessment 3 Prompt was: *What do these pictures represent? This is the concept map you did with Ms._______. What do the pictures tell you about plants?*

FIE staff videotaped each child’s response to Assessment 3, transcribed the responses, and developed individual concept maps for each child’s portfolio. Each portfolio provides documentation of the responses to assessments and shows each child’s growth over the project’s implementation. See Appendix D for samples of concept maps based on students’ statements.
Objective 4: Help scaffold children’s thinking about plants and their relationship to the environment by providing advance organizers as an instructional tool.

The non-fiction books purchased for the classrooms served to provide factual information about plants and butterflies for the lessons. Reading the books to the children served as a form of advance organizer for lesson content. The books included titles such as, *We Need Sunlight, Water, and Soil*, *From Seed to Plant*, and *How a Plant Grows*. Also, the teachers used the *Understanding by Design* process to develop the unit. Through this “backward design” process, the big ideas and essential questions were identified before the learning activities were planned. The big ideas and essential questions also served as advance organizers for lesson discussions and activities. Some of the big ideas and essential questions were the following:

- The world is made up of living and non-living things.
- Certain plants attract butterflies.
- What do living things need from the environment to survive?
- What are the basic characteristics of living things?

See Appendix A, p. 7, for the complete list of big ideas and essential questions included in the unit.

Objective 5: Help young children develop conceptual thinking by providing opportunities to develop concept maps using word/picture cards.

Each class constructed an initial concept map to illustrate the children’s understandings about butterflies and plants. Pictures and word cards were provided by FIE staff. As part of their literacy instruction, the children had been engaged in activities related to Eric Carle’s book, *The Very Hungry Caterpillar*. The concept maps reflected their understandings of the life cycle of the butterfly. One vocabulary word had to be addressed through explicit instruction because Eric Carle used the word cocoon instead of chrysalis throughout his book. Most students had limited knowledge of plant parts and their functions.

The final concept map was again constructed using pictures and word cards of plants and parts of plants provided by FIE staff. Teachers led the discussions in each class. The final concept maps reflect that children could connect second- and third-level concepts, e.g., a plant (first level) can have a flower (second level) that can provide fruit (third level). The initial and final concept maps appear in Appendix C.

Assessments:

*Assessment 1: Task of sorting and organizing around pictures about plants and butterflies.*

Children were assessed individually by FIE staff. Pictures of the children’s concept maps were reviewed. Two-thirds (67%) of the four-year-old children were able to make at least one, second level concept connection about plants. Their connections were basic, such as, “flowers (first level) need sunlight (second level).” Only 35% of the three-year-old
children were able to make at least one, second level concept connection. The three-year-olds tended to name the pictures without making connections.

Assessment 2: Individual talk—“What do we know about plants?”
Children were assessed individually by FIE staff and their responses were transcribed. Responses ranged from 3 words to 136 words. Concept maps were constructed to reflect their statements about plants. A review of the concept maps revealed that 18 (64%) four-year-old children and 7 (41%) three-year-old children were able to make second and third level concept connections.

Assessment 3: To assess the understanding of the final concept map itself, each child was asked, “What do these pictures represent? This is the concept map you did with Ms. _____. What do the pictures tell you about plants?”

Children were assessed individually and videotaped by FIE staff. Their responses, ranging from 7 to 117 words, were transcribed and concept maps constructed based on their statements. A review of the concept maps revealed that 28 (93 %) four-year-old children and 11 (85%) three-year-old children were able to make second and third level concept connections. Based on the results of the three assessments, both hypotheses can be rejected.

Plans for future projects: (presentations, publications, grant applications)

This project was designed to be ongoing. The teachers and children are continuing to take care of the garden. Butterflies are being attracted to the milkweed plants and passion flower vines. There are monarch and gulf fritillary caterpillars on the plants now (August). The children have also observed ladybugs doing their job as natural predators of the aphids on the milkweed plants.

As seasons change and plants die, it will be necessary to purchase new plants. Grant funding is available through both Home Depot and Lowe’s. FIE staff will submit proposals for grant funding through both companies.

On July 20, 2007, FIE staff made a presentation to the Exchange Club of the Jacksonville Beaches, a local service organization. The Exchange Club has created butterfly gardens at two local elementary schools. After the presentation, a couple of members indicated interest in helping us maintain the butterfly garden through volunteer service.

The unit plan will be made available to other child care centers through FIE’s partnership with the Early Learning Coalition of Duval and to the Title I Prekindergarten Office of the Duval County Public Schools. Use of concept maps as an instructional strategy to improve children’s cognitive development will be included.

A policy brief and the instructional plan will be posted on the FIE Web site.
Another possibility for dissemination is the 3rd International Conference on Concept Mapping that is scheduled for the week of September 22, 2008. The conference will be hosted by the University of Tallinn, the University of Helsinki, and the Institute for Human and Machine Cognition.

The findings and instructional design will also be submitted to the Institute for Human and Machine Cognition (IHMC). IHMC is a non-profit research institute of the Florida University System.

Lastly, an article about the project will be written and submitted to early childhood journals such as *yc/Young Children* and *Childhood Education*. The focus of the article will be on conceptual development.

**Other indicators of success/importance:**

This study has provided data about concept development of young children. The focus of the study is aligned with Mayor Peyton’s literacy goal of all children entering kindergarten, “Ready to read, ready to learn, and ready to succeed.”

See Appendix E for pictures that document the development of the garden and the involvement of the staff and children.

**References:**


Zimmerman, C. The development of scientific reasoning skills: What psychologists contribute to an understanding of elementary science learning. (Unpublished final draft of a report to the National Research Council Committee on Learning Kindergarten through Eighth Grade, August 2005).
Appendix A

Understanding by Design
Title: Young Florida Naturalists (SEED Grant)  Topic: Planting a butterfly garden

Stage 1-Desired Results

Established Goals (What relevant goals will this design address)
VPK Standards/Birth to Three Standards/School Readiness Standards

<table>
<thead>
<tr>
<th>Understandings (What are the big ideas? What specific understandings about them are desired? What misunderstandings are presentable?)</th>
<th>Essential Questions (What provocative questions will foster inquiry, understanding, and transfer of learning?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will understand that…</td>
<td>• What do living things need from the environment to survive?</td>
</tr>
<tr>
<td>• The world is made up of living and non-living things.</td>
<td>• What are basic characteristics of living things?</td>
</tr>
<tr>
<td>• Living things grow/change.</td>
<td>• What are basic characteristics of non-living things?</td>
</tr>
<tr>
<td>• Plants are living things.</td>
<td>• What is an insect?</td>
</tr>
<tr>
<td>• Plants must have water, air, light, nutrients, and soil to grow (responsibility).</td>
<td>• How do plants and insects rely on one another?</td>
</tr>
<tr>
<td>• Plants consist of basic parts that can include stem, root, leaf, flower, and fruit.</td>
<td>• How do butterflies help plants/flowers?</td>
</tr>
<tr>
<td>• Each part of a plant has a different function.</td>
<td>• What is a life cycle?</td>
</tr>
<tr>
<td>• Butterflies are insects.</td>
<td></td>
</tr>
<tr>
<td>• Certain plants attract butterflies.</td>
<td></td>
</tr>
<tr>
<td>• Butterflies have a life cycle that includes egg, caterpillar, chrysalis, and butterfly.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Students will know… (What key knowledge and skills will students acquire as a result of this unit?)</th>
<th>Students will be able to… (What should they eventually be able to do as a result of this unit?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Plants are living things that grow and change.</td>
<td>• Sort pictures into living and non-living categories.</td>
</tr>
<tr>
<td>• Living/non-living things have certain characteristics.</td>
<td>• Apply understandings about plants to design a concept map of their knowledge.</td>
</tr>
<tr>
<td>• Plants need air, water, soil, and sunlight to survive.</td>
<td>• Apply understandings to class experiments with plants and butterflies.</td>
</tr>
<tr>
<td>• The name and function each plant part including seed, stem, root, leaf, and flower.</td>
<td>• Identify parts of a plant using pictures.</td>
</tr>
<tr>
<td>• Butterflies are insects.</td>
<td>• Explain the function of a seed, root, stem, leaf, and flower when shown a picture of each.</td>
</tr>
<tr>
<td>• Butterflies get their food and shelter from plants.</td>
<td>• Apply understandings about the needs of plants to plant a seed that will sprout into a plant.</td>
</tr>
<tr>
<td>• The butterfly life cycle shows it grows and changes in 4 stages including egg, caterpillar, chrysalis, and butterfly.</td>
<td>• Identify the parts of a butterfly when shown a basic model.</td>
</tr>
</tbody>
</table>

Stage 2–Acceptable Evidence

Performance Tasks:
• Picture sorting
• Planting seeds/plants
• Sequencing stages of the life cycle
• Caring for plants

Other Evidence:
• Concept mapping
Stage 3: Learning Activities

Learning Activities

Lesson 1—Living and Non-Living

Students will apply understandings of living and non-living things by individually sorting picture cards of living and non-living items. This is an introductory activity for the unit. After reading aloud *Things That Are Living* and *Things That Are Non-Living*, students will learn about the characteristics of living/non-living things. They will then watch the teacher model how to sort living and non-living picture cards. While the teacher is modeling, questions will be asked of the students, “What is this picture?”; “Is this living or non-living?”; “What makes you say that?” They should be encouraged to name items (other than the picture cards) that could be classified as living/non-living. Children will then be given a mat labeled Living/Non-Living and a bag of pictures to sort into the two categories. Following a teacher demonstration on how to use the mat and place the pictures into categories, the students will classify the picture cards in the bags using the mat. (Pictures and anecdotal records of the students’ work will be taken.)

* Week 1 Vocabulary: nonliving, living, change, breathe, grow

Lesson 2—PRE-ASSESSMENT: Class Concept Map of Plants and Butterflies

Read aloud *The Butterfly Life Cycle* and *Green and Growing*. Students will organize pictures of concepts based on information from the texts. Group discussion will be prompted by the teacher saying, “Here are some pictures to help you remember.” Students will come to consensus on the order/placement of the pictures. The class concept map will be recorded and replicated on banner paper. Throughout the unit, students will make revisions to the class concept map based on new understandings about the content.

Lesson 3—Application of Understanding of Living and Non-living Things

After re-reading *Things That Are Living* and *Things That Are Non-Living*, students will be placed in two groups (1 group with the teacher, 1 group with the assistant). The groups will go on a nature walk looking for living and non-living things. As students identify items, their responses will be recorded. At the conclusion of the walk, students will gather in the classroom for circle time and discuss their findings. Teachers will record what students find on chart labeled Living and Non-living. At the conclusion, students will be asked the See/Think/Wonder questions: What did you see?; What did you think?; and What did you wonder about living and non-living things?

Lesson 4: Understanding What Plants Need

Students will gather on the carpet, and the teacher will read *We Need Sunlight, Water, and Soil*. Following the read-aloud, the teacher will engage students in conversation about the importance of sunlight. The teacher will then conduct an experiment in which 2 plants will be exposed to different levels of light. One will be placed in appropriate light conditions, and the other will be stored in a dark place. Students will be asked to make predictions about what will happen. Following the experiment, students will be called to the teaching table in small groups, where they will be asked to sort pictures into 2 categories: objects that need sunlight and those that do not need sunlight. After all children have circulated through the teaching table, they will come to the carpet and review the day’s lesson. Students will continue to observe the plants, and the teacher will record their observations.

* Week 2 Vocabulary: light, soil, water, minerals, responsibility, care

Lesson 5: Understanding What Plants Need

Students will gather on the carpet, and the teacher will read *We Need Rain*. Following the
read aloud, the teacher will engage students in conversation about the importance of rain. The teacher will then conduct an experiment in which 2 plants will be given different amounts of water. One will be watered, and the other will not. Students will be asked to make predictions about what will happen. Following the experiment, students will be called to the teaching table in small groups, where they will be asked to sort pictures into 2 categories: objects that need rain and those that do not need rain (water). After all children have circulated through the teaching table, they will come to the carpet and review the day’s lesson. Students will continue to observe the plants, and the teacher will record their observations.

**Lesson 6: Understanding What Plants Need**

Students will gather on the carpet, and the teacher will read *What Needs Soil?* Following the read-aloud, the teacher will engage students in conversation about the importance of soil. The teacher will then conduct an experiment in which 2 plants will be planted in different types of soil. One will be planted in soil, and the other will be planted in sand. Students will be asked to make predictions about what will happen. Following the experiment students will be called to the teaching table in small groups, where they will be asked to sort pictures into 2 categories: objects that need soil and those that do not need soil. After all children have circulated through the teaching table, they will come to the carpet and review the day’s lesson. Students will continue to observe the plants, and the teacher will record their observations.

**Lesson 7: Understanding What Plants Need**

Students will gather on the carpet, and the teacher will read *We Need Air.* Following the read aloud, the teacher will engage students in conversation about the importance of air. The teacher will then conduct an experiment in which 2 plants will be exposed to different conditions. One will be placed in the classroom where the air is always circulating, and the other will be placed in an airtight bag. Students will be asked to make predictions about what will happen. Following the experiment, students will be called to the teaching table in small groups, where they will be asked to sort pictures into 2 categories: objects that need air and those that do not need air. After all children have circulated through the teaching table, they will come to the carpet and review the day’s lesson. Students will continue to observe the plants, and the teacher will record their observations.

*Week 3 Vocabulary: seeds, pot, water, sun, sunlight, shovel, watering can*

**Lesson 8: Planting Individual Seeds**

The students will join together on the carpet for this activity. The teacher will read *This Little Seed*, which introduces the process of planting seeds. Using picture cards on a sentence strip, the teacher will model the correct sequence of seed planting. The children will then be called to the teaching table in small groups. They will again review the sequence of seed planting using the picture cards. The students will each plant a lima bean seed using the proper sequence. Materials needed: Styrofoam cups, soil, shovels, water, marker, lima beans. After all children have circulated through the teaching table, they will come to the carpet and review the day’s lesson.

**Lesson 9: Planting Outdoor Flower Box**

The students will gather on the carpet. Today students will be informed that each of them will have the opportunity to help plant the outside flower boxes. *Planting and Growing* will be read aloud, followed by a review of the steps for planting a garden. This will be done by using the picture cards from the previous lesson. Then the teacher will take small groups of students outside and speak to them about preparing and planting a garden. Each group of children will complete a section of the semicircular planter (or flower box). After completing their work with the planters, the students will return to the classroom and draw a picture of their favorite step in the planting process. After all children have completed this activity, they will come to the carpet and share their drawings.

**Lesson 10: Parts of a Plant, Part 1**

Today the students will learn the following parts of a plant: seed, roots, and stem. Two
books will be read, *From Seed to Plant* and *How a Plant Grows*. After reading the books, students will be able to individually practice identifying these three parts using a felt board kit. The teacher will then lead a discussion about the function of the seed, roots, and stem. As a class experiment, 3 stems of white carnations will be placed into 3 separate vases. Each vase will be filled with food coloring and water (red, blue and yellow). Emphasis will be placed on the stem. The job of the stem is to transport nutrients from the soil and water to the leaves and flower. At this point students will make predictions about what will happen to the flowers. Students will observe and chart the progress each day as part of a morning routine.

*Week 4 Vocabulary:* stem, leaf, root, seed, flower, tap root, fibrous root, sprout, nutrients, underground

**Lesson 11: Parts of a Plant, Part 2**

The students will begin today’s lesson with a review of the seed, roots, and stem. They will quickly observe the flowers in their class experiment and discuss the results. The teacher will then continue by introducing the following parts of a plant: leaves, fruit, and flower. Using the felt board activity, the students will assist the teacher in displaying and labeling the leaves and flowers. The teacher will read *From Seed to Plant* and *How a Plant Grows*, specifically stating the functions of these two parts. The students will then be called to the teaching table in small groups to complete an activity. Each child will be given rubber stamps and instructed to create a picture of a plant. Upon completion, the students will gather on the carpet and the teacher will choose some volunteers to identify all plant parts learned in lessons 10 and 11.

**Lesson 12: Planting the Root Garden**

Gather children on the carpet. The teacher will read *Roots* and discuss two types of roots, tap root and fibrous root. Children will also discuss how roots hold a plant in the ground and give a plant the water and nutrients it needs to survive. The teacher will then display pictures of fibrous roots and tap roots for the class to sort. Each child will then be given a work mat with two headings (fibrous and tap) to use as they individually sort picture cards of each type of root. Following the individual activity, children will discuss their findings in a whole group discussion during the lesson closing. Seeds will also be planted in the viewable root garden for observation.

**Lesson 13: Butterfly Parts: Butterflies are Insects, Part 1**

The students will sit on the carpet. The teacher will read *Insects Up Close* and discuss butterflies as part of the insect family. Insects (butterflies) have 3 body parts: head, thorax, and abdomen. Using an enlarged diagram of a butterfly, identify and label these 3 parts with the children. Then read *Butterflies Are Insects* (teacher-made book). Explain to children that they will be doing an activity at their seats. They will be given a butterfly printable and instructed to paint only the parts we learned today: the head, thorax, and abdomen. Set children’s work aside to dry to be used in conjunction with next lesson. After all children have completed this activity, they will come to the carpet and review the day’s lesson.

*Week 5 Vocabulary:* chrysalis, caterpillar, butterfly, egg, proboscis, abdomen, thorax, wings, antenna, head, legs, eyes

**Lesson 14: Butterfly Are Insects, Part 2**

Begin this lesson with a review of the 3 insect parts that were taught in lesson 13: head, thorax, and abdomen. Explain to children that butterflies also have many other parts. Read *Butterfly Parts* to the class and discuss the functions of these parts. Refer to the butterfly diagram used in the previous lesson. Identify and label the newly introduced parts. Using a pointer, have children come up and identify the body part of the butterfly that they choose. Children will now be sent back to their seats to complete the activity that was started during lesson 13. Post the children’s pictures in the classroom. After all children have completed this activity, they will come to the carpet and review the day’s lesson. The teacher will ask for some volunteers to identify the parts of a butterfly.

**Lesson 15: Preparing the Playground Garden**

Gather children on the carpet. Tell them they are going to be starting a whole new
garden. This new garden will attract butterflies!!! To help the class know what to do to prepare the garden for the plants, read *Mrs. Spitzer’s Garden*. After reading the book, chart all of the things Mrs. Spitzer did to prepare the garden. Next, children will be taken to the garden in small groups and given a small job to help get the garden ready for planting (placing soil in the garden, weeding, etc.). Gather children back on the carpet and discuss/review what was done to help get the garden ready for the plants.

* Read *The Butterfly Farm* by June Young in preparation for the field trip to Tree Hill.

* Week 6 Vocabulary: garden, soil, shovel, gloves, watering can, weeds, mulch, flowers, pests, nectar, grass, warm, shelter, healthy

**Lesson 16: Kickoff with Butterfly Pavilion: What Do Butterflies Need to Survive?**

The children will join at the carpet for the reading of *What Butterflies Need to Survive*. If the caterpillars have arrived via mail, begin to set up the butterfly habitat in front of the children. The teacher will explain the steps as she completes them. After a few examples, invite the children to assist in the preparation. Create a chart to record daily observations of the butterfly habitat.

**Lesson 17: Butterfly Pavilion (continued)**

Begin this lesson with an observation of the pavilion. Have students discuss what they think will happen. The teacher will then explain what the students will be seeing over the next 7-10 days. This will be followed by a sequencing activity. The students will be called to the teaching table in small groups. They will be instructed to color, cut, and, sequence the 4 stages of a butterfly’s life. Upon completion, the students will gather and volunteers can share their work.

**Lesson 18: Butterflies Need Food and Shelter**

Children will continue to observe the pavilion and discuss what changes have occurred. The teacher will reread *What Butterflies Need to Survive*. Children will place oranges in the butterfly pavilion. Observations of the butterflies will be made. The teacher will encourage individual talk regarding the needs of butterflies.

**Lesson 19: Butterfly Life Cycle/Plants Science Centers**

This lesson will be a review of the butterfly life cycle. The teacher will begin by reading *The Butterfly*. Students will then be divided into science centers that reinforce the concepts learned throughout the unit.

- butterfly life cycle stamping activity
- symmetry activity
- caterpillar painting activity
- tissue butterfly activity
- shelter activity
- plant activities

* Review unit vocabulary

**Lesson 20: Butterfly Life Cycle/Plants Science Centers (continued)**

This lesson will be a review of the butterfly cycle. The teacher will begin by reading *Butterflies*. Students will then be divided into science centers that reinforce the concepts learned throughout the unit.

- butterfly life cycle stamping activity
- symmetry activity
- caterpillar painting activity
- tissue butterfly activity
- shelter activity
- plant activities

* Review unit vocabulary

**Lesson 21: Butterfly Life Cycle/Plants Science Centers (continued)**

This lesson will be a review of the butterfly cycle. The teacher will begin by reading *Butterflies*. Students will then be divided into science centers that reinforce the concepts learned
throughout the unit.
- butterfly life cycle stamping activity
- symmetry activity
- caterpillar painting activity
- tissue butterfly activity
- shelter activity
- plant activities

* Review unit vocabulary

**Lesson 22: Grand Finale**

Parents will be invited this day to view a slide show summarizing the science unit on plants and butterflies. The students’ work will also be displayed for viewing. Following a tour of the garden planted by the students, the butterflies will be released.

**Family Field Trip: Tree Hill 6th Annual Butterfly Festival, April 28, 2007**
Appendix B

Family Involvement Activity Bags
Butterflies Family Involvement Activities

Plants Family Involvement Activities
Appendix C

Three-and four-year-old combination classroom
Initial Class Concept Map

Three-and four-year-old combination classroom
Final Class Concept Map
Four-year-old Classroom
Initial Class Concept Map

Four-year-old Classroom
Final Class Concept Map
Four-year-old Classroom
Initial Concept Map

Four-year-old Classroom
Final Concept Map
Student #1

Tell me what you know about plants.

Plants have seeds.
Seeds grow into stems.
Stems have petals.
Petal have leaves.
Leaves have flowers.
Flowers go into dirt.
Dirt needs seeds.

Student #1 5_3_07

Three- and four-year old combination classroom
Assessment 1

Assessment 2
Student #1

What do this pictures represent? What do they tell us about plants?
Tell me what you know about plants.

- Plants need sunlight.
- Plants need water.
- Plants need air.
- Plants need soil.
- Plants must have the right amount of water.
Student #2 Assessment 3

What do these pictures represent? What do the pictures tell you about plants?

- Plant care
- Plants need soil
- Plants need air
- Plants need sunlight
- Plants need water
- Roots are taproots
- Roots grow new leaves
- Leaves
- Seeds pop out into flowers
- Bees get nectar
- Butterflies drink juice
- Nectar makes honey
Tell me what you know about plants.

Plants
  - beautiful
  - little
  - can be
  - can be

- tall
- grow

- look like green
- trees

- roots

- have
- have
- have
- have

- leaves
- flowers
- seeds

Student #3 5_1_07
Assessment 3
What do these pictures represent? This is the concept map you did with Ms. Vera. What do the pictures tell you about plants?

Student #3 5_22_07
Appendix E

Pulling weeds in the playground to prepare to garden

Spreading soil to prepare the garden
The garden in full bloom

Native butterfly host plant: purple porter weed
Welcome to our garden

A ladybug eating aphids on milkweed leaves
Butterfly host plant: Purple passion flower vine

Exploration and discovery