City Green School Grounds

A Curriculum Guide

City Green

K-4 Garden Units

October 19, 2010

List of lessons for the garden team:

Each lesson consists of 3 or more visits to the garden to fully engage students in the outdoor experience and to make the best possible use of the garden as a classroom tool. Lessons will be demonstrated and reviewed at the Teacher Training workshop.

1. **Salad Garden:** ***Objective:*** Students understand where their food comes from and the importance of eating healthy food.

   Garden Visit 1: Students plant radish seeds and a variety of lettuce starts. They compare the different planting methods for each type of food crop. They reinforce concepts of what living things need to grow, plant parts, climate and its impact on agriculture.

   Garden Visit 2: Students visit the garden frequently to water and weed their garden. They learn how plants compete for resources just as humans do. They measure and track the growth of their seedlings.

   Garden Visit 3: Students visit the garden and harvest their salad. They wash dirt from the leaves and radishes carefully. They share a simple meal of lettuce, radishes and a simple dressing. Students discuss the importance of eating healthy food for growing strong and smart.

2. **Bulb planting and Tulip Project** ***Objective:*** Students understand how climate affects living things

   Garden Visit 1: Students prepare a garden bed for bulbs by digging the soil, and adding compost. Students discuss how bulbs require cold weather to produce a flower in the spring. Students plan the arrangement and then plant the bulbs based on flower size, color and bloom time.

   In-Class Lesson: Students read excerpts from *Tulipomania* about the runaway bulb market of the 1500s. Students discuss the value of goods and understand the relationship of supply and demand using a historical event for context.

   Garden Visit 2: Students visit the garden in the spring and watch for growth. They record the appearance of the earliest bloomers and collect data on their size and length of bloom. Students relate flower growth to the weather changes and the arrival of spring.

3. **Garlic Patch** ***Objective:*** Students study the history of garlic and plant a crop for harvest in the spring.

   Garden Visit 1: In the fall, students study the origin of garlic and its cultural history. They visit the garden to prepare a garlic bed. Using grocery purchased garlic heads, students each plant a clove of garlic in the soil.

   Garden Visit 2: Students monitor the growth of their garlic bed by making periodic measurements. They check the growth of the root by digging a clove up at each visit. Students research the modern culture of garlic.

   Garden Visit 3: In the late spring, students visit the garden to harvest their garlic. They observe how the cloves have become clones of their parent. They calculate how many heads of garlic can be grown from one head and study the multiplier effect of agriculture.

4. **Insect Study and Ladybug Kits:** ***Objective:*** Students understand the bio-network in garden.

   Garden Visit 1: Students visit the garden in the early spring. They discuss how insects use camouflage for protection against birds. Using colored beans or toothpicks, students perform a study to determine the relative advantage of well camouflaged insects.

   In-Class Lesson: Students cultivate garden helpers in their classroom. Teachers may use a commercially purchased ladybug kit, or create a worm terrarium from reclaimed materials. Students learn the life cycle of insects and worms as they provide the food and soil to meet the needs of their living helpers. Worms and ladybugs are observed and quickly released into the garden.

   Garden Visit 2: In late spring, students visit the garden to collect insects. They discuss how insects have different jobs in the garden, some positive and some negative. Students categorize their insects and record data about the insect they collected on an Observation Chart.

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5. **Mathematics in the Garden** ***Objective*:** Students use the garden as they learn math concepts.

Lesson 1: Number Operations, & Algebra—A garden walk to count garden objects, create a coordinate grid to locate objects, and fractions as they divide garden beds into parts.

Lesson 2: Measurement—measuring plants in centimeters and inches, measuring with hands, strides, centimeters, and inches. Measuring volume by displacement.

Lesson 3: Geometry—Finding shapes in sliced garden foods, garden beds and elements of the garden; kinds of triangles; measuring angles; symmetry.

6. **Herb Garden** ***Objective:*** Students experience the flavors and smells and culinary uses of herbs.

Lesson 1: Students install herb seeds and starts in the garden. They learn about the medicinal and culinary uses for the herbs.

Lesson 2: Students make a sensory tour of their herb garden.

Lesson 3: Students harvest the herbs and use them in a nutritious meal and garden gifts.

7. **Soil and Cover Crops:** **Objective:** Students understand how soil health impacts the garden.

Garden Visit 1: In the fall, students plant a cover crop of green manure. They study soil erosion and the importance of controlling erosion. They monitor the cover crop growth through the winter.

Garden Visit 2: In the spring, students test their garden soil for fertility. They discuss the different particle sizes in garden soil and how particle size impacts the growth rate of plants.

Garden Visit 3: Students analyze their test results and choose an appropriate soil amendment to add to the garden. They learn how amending the soil adds nutrients that the plants need. They discuss the techniques that commercial growers use for tend to soil health.

8. **Food Science in the Garden** **Objective:** Students study the parts of edible plants

Lesson 1: Leaves; Students use the scientific method to explore how plants use their leaves to make food and transport water.

Lesson 2: Roots; Students dissect root foods and investigate how plants use roots to make the food they need to grow.

Lesson 3: Seeds; Students taste and study edible seeds.

9. **Three Sisters Garden:** **Objective:** Students learn the Native American companion planting method and appreciate the symbiotic relationship between each plant in the garden.

Garden Visit 1: Students read the legend of the Three Sisters and study how native people cultivated the soil without tools or equipment. Students plant corn.

Garden Visit 2: Students return to the garden when the corn is 6 inches tall and plant beans and squash seeds. They visit the garden frequently to monitor growth and weed their garden until the squash plants are large enough to shade the weeds.

Garden Visit 3: In the fall, students harvest the corn and husk it. Students harvest the dried beans and boil them until they are soft. Students harvest the squash and eat them or make garden sculptures with them.

10. **Alphabet Garden** ***Objective:*** Students reinforce reading and writing skills through gardening.

Lesson 1: Students read seed catalogs to identify at least one plant that begins with each letter of the alphabet. They make a complete list of the garden plants and make a garden map of each plant's placement.

Lesson 2: Students install the alphabet garden by planting seeds, starts or shrubs. They make plant labels to identify the plant and describe its growing needs.

Lesson 3: Students use the garden to prompt writing. They write poetry, expository essays, descriptions, how-to essays, and newspaper articles to communicate about their garden.

Grades 5-8 Garden Units

October 19, 2010

1. **Establish Habitat Garden Certification** ***Objective*:** Students provide the elements for official certification of their habitat garden.

   Lesson 1: Take a Site Inventory. Students review the requirements for a habitat garden certification. They make plans for installing the missing elements.

   Lesson 2: Install Habitat Garden Elements: Students hang birdfeeders, erect a birdbath, and construct garden features to shelter and protect the young of the garden creatures who will call this garden home.

   Lesson 3: Claim the Space: Students post their official certification notice and make a sign that explains the features of the garden that have earned the habitat garden certification.

2. **Salad Garden 5-8:** ***Objective:*** Students understand where their food comes from and the importance of eating healthy food.

   Garden Visit 1: Students plant radish seeds and a variety of lettuce starts. They study the differences between convention and local food systems.

   Garden Visit 2: Students visit the garden frequently to water and weed their garden. They study the origin of foods by tracing the foods that make up their breakfast.

   Garden Visit 3: Students visit the garden and harvest their salad. They study the elements of food sustainability and brainstorm ways that their city can become more sustainable.

3. **Composting** ***Objective:*** Students recycle kitchen and lunch scraps to build healthy soil for their garden.

   Lesson 1: Students learn about nature's cycles, including the nitrogen, carbon, and water cycles. They trace their trash and compare the human methods of waste management to that of nature.

   Lesson 2: Students learn the basics about composting and build a compost bin.

   Lesson 3: Students educate their peers on reducing waste. They monitor waste stations in the cafeteria to collect organic materials for the compost bin.

4. **Grow Lab** ***Objective:*** Students learn the science of growing plants from seeds.

   Lesson 1: In January, students study seed catalogs to choose the seeds to plant. They study their growing needs and make decisions about how to best use the grow lab.

   Lesson 2: In February, students plant the first seeds of their project. They monitor the growth of the seedlings.

   Lesson 3: Students transplant their seedlings into the school garden.

5. **History of Food** **Objective:** Students understand the origin of food, its cultural significance, and how its cultivation was influenced by patterns of trade.

   Lesson 1: Tomatoes— Students find the origin of the tomato to South America, trace its travel and early cultivation in Europe, and its identity with Italian cuisine. They use fresh tomatoes to make salsa and pizza in the kitchen.

   Lesson 2: Tea—Students research tea from China and elsewhere. They study significant events in the tea trade, including the Boston Tea Party. They learn traditional methods of drinking tea. Finally they make tea from herbs in the garden.

   Lesson 3: Chocolate—Students study the history of cocoa to extend a unit on Mexico and Spanish colonialism. Study the original trade of chocolate. Then watch a video on the modern cocoa processing, and evaluate the social conflicts in the modern chocolate trade. Finally, make a recipe for the original chocolate drink.

   Lesson 4: Grains—Students research culturally significant grains, including rice (Asia), Oats (Scotland) , barley and rye (northern Europe), quinoa (Incan/Mexican), millet (India), teff (Ethiopia), and corn and wheat (North America). They examine the economic importance of grain farming and cook samples of train dishes.

6. Climate and Weather: **Objective:** Students study the impact of climate on food.

Lesson 1: Students conduct a temperature study to identify heat islands and cold pockets within the micro climates of school and school garden. They draw conclusions about how city heat islands impact regional climate and food production.

Lesson 2: Students participate in the Journey North project by planting a bulb garden and studying the arrival of spring throughout the US.

Lesson 3: Students study seasonal foods and learn the climate needs of a variety of foods. Based on this content, they create a crop plan for their own school garden and for farms in a variety of global locations. They learn the value of eating seasonal foods.

7. English Language Learners: Grades 5-8 ***Objective:*** Students build language fluency through gardening.

Lesson 1: Nouns— Students create labels for objects in the garden.

Lesson 2: Adjectives—Students use the garden to develop a vocabulary of descriptive words.

Lesson 3: Verbs—Students put words to garden activities. They expand their language dictionary.

Lesson 4: Students use the garden to prompt writing. Beginning with sentences and progressing to poetry and essays.

Lesson 5: Students write poetry in their native tongue about a garden experience or an element of the garden. They work with dictionaries and translators to translate their poetry into English. They complete the project by creating a bilingual book of poetry with each poem presented in two languages.

8. Garden Gifts ***Objective:*** Students learn responsibility as they grow a garden gift to show appreciation for teachers or parents.

Lesson 1: Students plant dill, cilantro, or mint, or other fast growing herbs. They use purchase or recycle bottles for herb-infused oil or vinegar gifts.

Lesson 2: Students make and decorate seed envelops and fill with purchased seeds. Include recipes and growing instructions, and perhaps soil and pots as a springtime gift.

Lesson 3: Students grow herbs in the grow-lab. They decorate recycled tin cans as planters, and create a growing herb plant as a gift.

9. Art in the Garden **Objective:** Students use the garden to inspire artistic expression.

Lesson 1: Students study the work of Andy Goldsworthy as a leader in the Earth Art genre. They use natural materials to construct their own Earth Art.

Lesson 2: Students use recycled paper and seeds, petals, fibers, or other natural materials from the garden to make paper.

Lesson 3: Students make stamps using foods, leaves, or natural materials from the garden to create artistic works, gift tags, or decorative paper.

10 . Language Arts Skill Study **Objective:** Students use the garden to understand critical thinking skills.

Lesson 1: Compare and Contrast—Students tell how garden objects are alike and different. They place garden objects in a giant, outdoor Venn diagram to show differences.

Lesson 2: Predicting—Students use tasks in the garden to make predictions based on evidence and personal experience.

Lesson 3: Sequencing—Students write directions for a garden task. They edit their work to use transition words that show chronological order in their writing.

Lesson 4: Descriptive Writing—Students use the outdoor spaces as writing prompts for descriptive writing assignments.

High School Garden Units

October 19, 2010

List of lessons for the garden team:

Each lesson consists of 3 or more visits to the garden to fully engage students in the outdoor experience and to make the best possible use of the garden as a classroom tool. Lessons will be demonstrated and reviewed at the Teacher Training workshop.

1. **Inter-Generational Gardening** ***Objective:*** Students discover the richness of the past and build community.

   Spring Lesson 1: Students use a series of interview questions to learn about the past gardening experiences of their older partners. They gather information and plan the foods to be included in the garden.

   Lesson 2: Students cook foods from the garden with seniors. They share recipes and cooking know-how. The recipes are collected into a recipe book and shared between the school and senior facility.

   Lesson 3: Students conduct interviews about environmental and food issues. They collect information such as, how the environmental issues have changed, food packaging, or food availability. Students summarize the changes in a "Then and Now" bulletin board, newsletter, or publication.

2. **Colombian Trade** ***Objective*:** Students study the origin of food plants

   Lesson 1: Students begin with native plants to North, South, and Central America (potatoes, tomatoes, squash, sugar cane). They plant pumpkins, a three sisters garden and a native berry patch.

   Lesson 2: Students study native species of Africa (yams, watermelons, black eyed peas, and coffee) and Europe (mustard, parsnips, turnips).

   Lesson 3: Students tend their gardens and then study ethnic food cultures that rely on a global food trade for their existence.

3. **Shakespearian Garden** ***Objective*:** Students study the origin of food plants

   Lesson 1: Students begin their garden by planning an English garden and planting it with the plants mentioned in Shakespearian literature.

   Lesson 2: Students create labels for each plant with the name of the plant and the quotation from Shakespeare that mentions the plant.

   Lesson 3: Students study and perhaps visit other famous Shakespearean gardens in New York City and around the world.

4. **Chemistry in the Garden** **Objective:** Students extend their understanding of chemistry.

   Lesson 1: Students examine soil under the microscope looking for evidence of crushed rock. They create a rock garden that holds samples from classroom study.

   Lesson 2: Students grow red cabbage and make a pH paper from its juice.

   Lesson 3: Students extract iron from iron rich foods grown in the garden. Kale or spinach leaves are pulped and then students use magnets to extract iron.