

UNIT PLANNER and Lesson Plans: *Thomas Jefferson- Patient*
Gifted and Talented Education (G.A.T.E.) Specialist: William Gilluly
School: John C. Vanderburg Elementary School, Henderson, Nevada
Grade Level: 4 (Upper Elementary)
Dates:

Universal Concept(s): Change, Interdependence, Perception
Theme/ Topic- Use the medical history of Thomas Jefferson to examine methodologies for treating illness and attitudes concerning the practice of medicine in early America.

Generalizations:

Interdependence-

Can effect perception.
Can cause associations or affiliations.
Can be positive or negative.

Change-

Is continuous.
Can be good or bad.
Is necessary for growth.

Perception-

Its limitations are limited to the perceiver.
Is our primary source of knowledge.
Leads to assumptions.
Can be affected by different factors.

Focus Questions:

1. What were the prevailing attitudes toward the practice of medicine in Jefferson's time and did his own beliefs mirror those of the general public?
2. What options were available to a majority of people of the time when it came to the treatment of illness and injury?
3. What role did the cultivation of medicinal plants play in the lives of early Americans and who were the people chosen to administer to the sick?
4. In what ways did the beliefs and customs of ethnic groups influence the practice of medicine in Jefferson's time?

G.A.T.E. Expectancies/ Scope and Sequence:

Affective Domain- Demonstrate proficiency in a variety of cooperative learning situations and develop a network of appropriate adult and peer relationships. Leadership- work cooperatively to develop mutual respect, alternating leadership roles. Empathy- explore and discuss moral dilemmas and voice opinions. Independence- demonstrate independence by setting goals, planning, and completing tasks without teacher assistance. Decision Making- reflect, discuss and evaluate choices. Task Commitment- develop a prioritized checklist of necessary strategies to complete assigned tasks without teacher assistance and self-monitor tasks, quality of products, and due dates.

Cognitive Domain- (Critical Thinking) - Utilize brainstorming techniques to find solutions to problems and defend ideas generated. Apply innovative thinking in the creation of an original product. Data Interpretation- Engage in compare and contrast activities. Examine cause and effect in a variety of situations. Utilize knowledge of fact and opinion to examine information. Spatial Perception- Create an original product using spatial perception. Reasoning Strategies- Apply the cognitive processes (as identified by Bloom) of application, analysis, synthesis, and evaluation. Creative Problem Solving- Identify and use two problem solving strategies to: apply solutions to a problem to evaluate its effectiveness and select the best solution and/or compromise. Scientific Problem Solving- Observe a process, formulate questions based on observations, develop a workable hypothesis, analyze and draw conclusions from collected data, and communicate findings. Communication Skills- Compose and evaluate verbal and written directions. Research/ Inquiry Skills- Review, evaluate, and analyze multiple resources for valid information. Utilize and develop notes from charts, letters and graphs to create a research based presentation.

Instructional Activities:

A. Introduction: Introduce the subject of medicine in early America through a discussion of Hermann Boerhaave (1668- 1738). Boerhaave was a noted medical practitioner whose theories concerning the origin of diseases and treatments for various illnesses was widely accepted in Jefferson's time. Use George Washington as an example of how the treatment was often worse than the disease. Complete math lesson based on the amount of blood lost during treatment for a sore throat that directly contributed to his death.

B. Brainstorm: Have students use **bubble maps** to brainstorm why alternatives to treatments by trained physicians was the norm rather than the exception in early America. (The fear of doctors in general and the pain associated with their methods specifically, the expense involved and the scarcity of physicians even in large urban centers, the trust placed in family members or renowned community healers).

C. Lesson #1-Three Alternatives: Students form teams to research ailments and conditions affecting Jefferson and alternative methods of treating them. These treatments are approaches from the perspectives of Native Americans living in your area, slaves working at or near Monticello and Thomas Jefferson himself. ***NOTE-** This lesson is done in teams. I have found teams of 2 to 4 students are best. For this reason, the number of Jefferson's ailments chosen and the number of medicinal plants researched varies depending on the size of your class.

D. Lesson #2-Simulated Treatments: Students create 'simulated' decoctions, tinctures, or poultices based on their research. While the ingredients are for the most part substitutes for the real organic materials, the formulation and related measurements are true to the original preparation whenever possible.

E. Lesson #3- Garden Book (Scientific Journal): Teams will select one of the plants from their study to grow. Each member will be assigned jobs on a rotating base. The results of these jobs will be kept in a scientific journal that in many ways mirrors the 'Garden Book' of Thomas Jefferson. Jefferson faithfully kept this horticultural diary from 1766 until 1824. This book documents his varied approaches to gardening as seen through the eyes of a family gardener, scientist and landscape architect.

F. Lesson #4- The Tradition of Seed Saving: As was customary in early America, teams will collect and preserve seeds from their specimen plant for use by students next year.

G. Lesson #5- 'Useful Plant': This final lesson is done individually. In 1800 in *A Memorandum: Services to My Country* Jefferson wrote "The greatest service which can be rendered any country is to add a useful plant to its culture." In this spirit, students will invent a new plant; be it vegetable, fruit or flower and classify it scientifically.

Instructional Strategies:

Use excerpts from the book *'Thomas Jefferson Treats Himself'* to establish a basis for the study of attitudes and beliefs related to the practice of medicine in the colonial era.

Use the *SmartBoard* to facilitate cross-cultural connections concerning medical practices and philosophies for treating illness.

Use the *Internet and Informational Text* to research the use of plants for medicinal purposes over time and the methodologies for administering such treatments.

Differentiated Strategies:

-For a majority of this unit, students will be working in teams of no fewer than three and no more than four. Jobs will be assigned each member on a rotating basis. (See Instructional Activity # _7_).

-This unit combines written, verbal and visual components and provides opportunities for demonstrating research, leadership and upper level thinking skills.

-All material will be delivered and shared through multiple learning styles and modalities.

-Lessons/ activities are broken down into smaller, sequential parts to foster understanding.

Assessment Strategies:

In a unit such as this, an assortment of assessments will be employed to measure progress. A majority of assessments will be in the form of anecdotal records. The products of the various lessons will be used as alternative assessments.

Materials/ Resources:

Books- Thomas Jefferson Treats Himself (Herbs, Physicke, & Nutrition in Early America) By John M. Holmes ISBN 0-9630797-3-5

Native Plants Native Healing (Traditional Muskogee Way) by Tis Mal Crow ISBN 978-1-57067-105-0

The Cherokee Herbal (Native Plant Medicine from the Four Directions) by J.T. Garrett ISBN 978-187918196

African American Slave Medicine by Herbert C. Covey

Thomas Jefferson's Garden Book, edited by Edwin M. Betts ISBN 13: 978-1-882886-11-1

Teacher Notes:

“If we wasn’t so sick Maser got an old negro mama to look after us and doctor us. She used herbs that she gathered in the woods such as sasfras (Sassafras) roots, cami weeds (Chamomile?), and then she gathered leaves

off peach trees and made syrup and gave us for chills and fever.” Eli Coleman- Born in Texas in 1846

Healing skills were an advantage to both slave and owner, but they also posed a threat. Slaves who knew their plants had ready access to poison. This fear prompted the enactment of laws. As early as 1748, the colony of Virginia forbade “any negroe, or other slave” to administer “any medicine whatsoever” under pain of death “without benefit of clergy”. An exception was made for slaves treating other slaves or her owner’s family, providing the owner gave permission. As an early historian observed: “With stringent laws and with fear of poisoning constantly in the public mind, it is surprising that any negroes should have attempted the risky business of prescribing to the sick.” Blanton, *Medicine in Virginia in the 18th Century*

In fact, the laws were no deterrent. Slave medicine flourished on plantations.

A BRIEF LOOK AT BOTANICAL ART IN 18TH CENTURY AMERICA

by Leslie Exton

The drawings honoring the life’s work of Lucy Marks currently at the Jefferson Library at Monticello are descendants of the great herbal drawings of the 6th century Juliana Anicia Codex of Dioscorides. This manuscript remained the standard for pharmaceutical and herbal writing for almost a thousand years; it demonstrates that in the investigation of the medicinal and healing properties of plants we find the beginnings of botanical art. Given that Lucy Marks had such an interest in the healing characteristics of plants it is not hard to imagine that she too might have studied plants through drawing.

In any case it is fair to assume that Lucy was aware of the genre of plant drawing. Though she was not “Williamsburg fancy” she came from an intellectually curious and educated family and was surrounded by books, pictures, and fine silver. Among the many volumes in her library she probably owned several herbals, or perhaps knew of them from her neighbors, Thomas Jefferson and William Byrd. The landed gentry of Virginia had considerable knowledge of plants and their properties and kept detailed documents and records of growing seasons and cultivation practices. No doubt they availed themselves of English and European botanical reference books.

One such reference could have been Elizabeth Blackwell's *A Curious Herbal*. This two-volume catalog, published in 1739, was one of the earliest plant inventories. Mrs. Blackwell (1700-1758), needing to support herself after the imprisonment of her husband, heard that London doctors required a good illustrated herbal guide. Though not an artist or plantswoman herself, she was enthusiastic and resourceful and set about studying and drawing plants from Chelsea Physic Garden, producing five hundred hand-colored plates. While her drawings lack the sophistication and poetic charm of some of her European contemporaries her pictures did what they were designed to do: inform the medical profession. Her book was an immediate success, and sold enough copies to get her husband out of debtors' prison.

While the finest examples of decorative botanical art of the 18th century were painted primarily for the aristocracy in England and France, it is from the journals and publications of visiting English naturalists that we have come to know our own native flora and fauna. One such botanist and artist was Mark Catesby (1682-1749), an Englishman who had contributed seed references for *The Catalogus Plantarum*, a publication of the London Society of Gardeners. His portion of the proceeds of this publication financed a visit to his married sister living in Williamsburg, Virginia, where he became a frequent guest of William Byrd, a plantation owner in nearby Tidewater. Byrd and Catesby became good friends, as they shared an interest in horticultural experiments and scientific observation.

Around 1720 Mark Catesby set out to explore and record the natural habitat of the eastern coast of North America. Catesby's meticulous illustrations were published in 1747 as the *Natural History of Carolina, Florida and the Bahama Islands*. They were among the first images of the natural world of the American colonies. These volumes were enormously successful in England and had a profound influence on the development of horticultural observation and the study of natural history in both American and European scientific communities. It is safe to assume that at some point Mark Catesby's life's work ended up in the libraries of Thomas Jefferson, William Byrd, and perhaps Lucy Marks.

William Bartram (1738-1823) was another botanical artist and nature writer of the 18th Century. Son of John Bartram, the official botanist to King George III for the American colonies, William Bartram was an artist, naturalist, and intrepid wilderness explorer – our first environmentalist perhaps! Bartram kept copious journals of his travels throughout the American Southeast, making drawings, collecting seeds, writing of his observations of plants and animals – a testament to living in harmony with nature. His book, *Travels through North and South Carolina, Georgia, and East and West Florida*, was published in 1791. A member of the American Philosophical Society in Philadelphia and well known to Thomas

Jefferson, Bartram was invited to participate in the Lewis and Clark expedition west. Feeling too old and frail for such an adventure, Bartram did not accompany the explorers.

As is evident by the artwork in our exhibit the elements of botanical art have evolved significantly since the illustrations of Dioscorides, Elizabeth Blackwell, Mark Catesby, and William Bartram. Today's botanical paintings are made less for their informative content than as fine artwork to be exhibited in museums, sold in commercial galleries, and displayed in contemporary parlors and drawing rooms. Botanical artists now come to the tradition more from art training and a lay interest in plants and the environment than from science. The improvement in pigments, papers, brushes and reproduction capabilities combined with more mature and sophisticated drawing results in what you see today – an exhibition we hope Lucy Marks would enjoy and appreciate.

Titles of a few of the many Botanical and Medical books found in Thomas Jefferson's library:

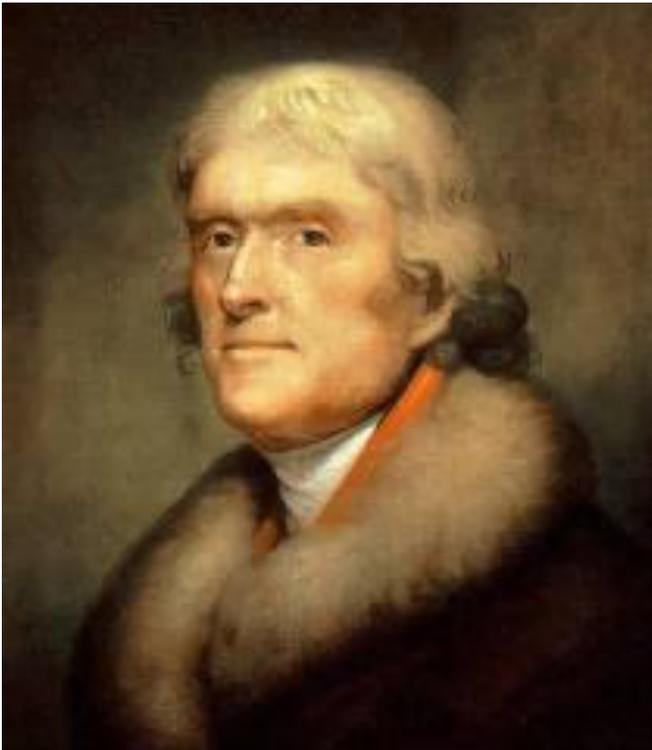
A Treatise of the Materia Medica by William Cullen

Riverius's Practice of Physic by Lazarus Riverius

Pharmacopoeia Extemporanea by Thomas Fuller, 1740

Pharmacopoeia Londinensis by William Salmon, 1682

The Edinburgh New Dictionary by Andrew Duncan, 1791



Introduction



Hermann Boerhaave (1668-1738)

Hermann Boerhaave was a noted early American physician whose theories concerning the origin and treatment of diseases was widely accepted during Jefferson's time. He believed that disease was an imbalance of natural activities. He recognized three conditions in the body that led to illness: Salty, Putrid and Oily. His remedies included to 'sweetening' the stomach and ridding impurities through bleeding and purging.

Case Study- George Washington

Bleeding was a common treatment for disease in the 18th century. It was common practice to bleed a patient every other day. At the time, it was believed that the body contained approximately 3 gallons of blood. (How accurate is this estimate?)

After a days ride George Washington refused to change out of his wet clothes and as a result suffered a severe sore throat. The swelling closed his throat to the point that he could no longer swallow. In the early hours of December 14th, 1799, doctors were called in. In an effort to relieve his pain, Washington was bled during the morning of 12 ounces of blood. When the doctors saw no improvement by that afternoon, they ordered him bleed again of another 24 ounces. That evening a third consulting physician ordered him bleed yet again. This time an additional 32 ounces of blood were drawn. Witnesses were quoted as saying that 'the blood did not flow free'. George Washington died later that same night. He was 67 years old.

You do the math.

- A. How many ounces are there in a gallon? _____
- B. In three gallons? _____
- C. What was the total number of ounces of blood left in Washington's body after the morning's bleeding? _____.
- D. After the afternoon bleeding? _____.
- E. After the bleeding in the evening? _____.
- F. Using the estimate of 3 gallons as a base, what percentage of the total amount of blood was lost due to the three bleedings? _____.

Lesson Plan #1- Three Alternatives

"If people let government decide what foods they eat and what medicines they take, their bodies will soon be in as sorry a state as are the souls of those who live under tyranny." - Thomas Jefferson

For the sake of this plan, I have chosen three ailments and a total of nine plants which will be grown as the focus of a Scientific Journal which will be explained later. Start by dividing your class into three groups. Next, have the students chose teams of 3 or 4 from within their group. Use cards to determine which approach to medical practice each group will be responsible for researching. (Ace of Hearts= Jefferson's Garden. Ace of Clubs= Slave Medicine. Ace of Diamonds= Native American healing practices). Next, consult either <http://www.healthinplainenglish.com/presidential-diseases/index.htm> or <http://www.doctorzebra.com/prez/g03.htm> for a list of maladies and conditions that affected Jefferson during his lifetime. I use a SmartBoard to display the doctorzebra site because it goes into more details about when Jefferson was afflicted, in many cases his referencing of these maladies in correspondence, and the severity of multiple episodes of the same disease. Assign each team a condition(s). I usual assign each condition a card. There are 12 maladies from which to choose. For the sake of this example, I have selected Rheumatism, Headaches and Boils. At this point, each team should have an affliction(s) they are researching and the methodology for treating it. *NOTE- I have small class sizes, so my three teams will be researching all three ailments using their assigned methodology. Team A will treat Jefferson's headaches, rheumatism and fractures using plants from his garden, Team B will treat these same ailments using Slave Medicines, and Team C will treat these ailments using traditional Native American practices. Again, the number of ailments assigned to each team will depend on the number of students in your class!

The Research Begins! In addition to the books listed under *Resources*, students should use the internet to research treatment options for their maladies from their assigned perspective. The Monticello website <http://www.monticello.org>, contains a wealth of information concerning Thomas Jefferson's life and career and should be used as a springboard for all research. In addition, in chapter 4 of

the book Thomas Jefferson Treats Himself titled *Jefferson and Madera Medica- A Garden Pharmacy* the author references an entry Jefferson made into his Garden Book dated late winter 1794. This entry lists 16 plants he wanted to introduce into his garden come spring. The list consists of herbs widely grown in colonial gardens for their medicinal value. I use this list as well as other plants from his garden as the basis of study. Students need to research each to determine which one(s) would be good for the treatment of their ailment(s). For students researching Slave Medicines, the book titled African American Slave Medicine contains three appendices- *A. Plant and Herbal Treatments*, *B. Unknown Plant and Herbal Treatments* and *C. Non-Plant and Herbal Treatments* which can serve as a valuable resource. ***NOTE-** For the sake of authenticity, I have chosen to limit the study of Native American medicinal studies to tribes known to the colonists of the time; tribes living in the Eastern part of the United States. I strongly feel the healing practices of tribes close to your school should be used. This provides an opportunity to bring this study close to home and provides opportunities to include local resources and guest speakers as part of your plan.

In addition to the two books on Native American Healing listed under Resources, two websites my students have found valuable are <http://www.powersource.com/cherokee/herbal.html> (Cherokee Messenger) and <http://www.angelfire.com/mi4/polcrt/herbs3.html> (Native Medicines and Herbal Cures).

When all three groups have completed their research, have them present their findings to the class. I like to have the groups display their findings on large sheets of chart paper which are then hung up around the room. Students then complete **DOUBLE BUBBLE MAPS** (graphic organizer) comparing and contrasting their medical approach to the others.

Lesson #1- Appendix

The following is a list of Plant and Non-Plant treatments for the three maladies Jefferson suffered from as was mentioned in the unit plan (Rheumatism, Headaches and Boils). These treatments are further broken down by category- Early American Treatments (Jefferson's Garden), Slave Medicine, and Native American Healing. This list is but a small sampling of the information available.

Thomas Jefferson's Garden-

Headaches: Lavender (*Lavandula spica*)- According to the *Edinburgh New Dictionary*, lavender used as a tincture was used for palsies, tremors and disorders of the head.

Peruvian Bark (quinine)- used as a decoction in colonial times for the relief of fever caused by malaria, Jefferson used it to help with the pain from his headaches.

Rosemary- 'used to treat problems of the head'.

Boils: Marshmallow- "mucilage of the roots ...much used in poultices for the relief of inflammation.

Rheumatism: Capsicum (pepper plant)- poultice effective as a means for treating aches within the joints.

-a liniment in which a tablespoon of cayenne pepper had been mixed.

Pot Marjoram (*Origanum vulgare*)- A salve is made by simmering 4 ounces of fresh marjoram for an hour in one pint of olive oil then strained; can be rubbed into rheumatic pain or applied in a compress to relieve headaches.

Wormwood (*Artemisia absinthium*)- Steep one quarter ounce of leaves in a pint of boiling water for 4 minutes, strain and sweeten; drink 2 cups per day.



Slave Medicine-

Headaches: **Black Snake Root** (*Polygala senega*)- Used to make tea for colds, fevers and headaches.

Horseradish (*Armoracia rusticana*)- root was used as a poultice on the head for headaches.

Vinegar mixed with **Hickory** ash

Nutmeg (*Myristica fragrans*)- worn around the neck

Non-plant based practices- Small amounts of salt was placed on the mole of the head. Lightning Bugs were worn in the hair for prevention.

Boils: **Okra** (*Abelmoschus esculentus*)- dried blossoms soaked in water.

Pokeweed (*Phytolacca Americana*)- boiled down and mixed with egg yoke and cornmeal.

Pokeroot blended with Lard and Turpentine to make a salve.

Rheumatism: **Bittersweet/ Bitter weeds/ Bittercrest weeds** (*Solanum dulcamara*) was combined with grease.

Black Haw (*Viburnum prunifolium*)- Barks from the Wild Cherry, Poplar, Black Haw, Slippery Elm and dried Mullein leaves were mixed and brewed to make bitters that was used to treat a variety of illnesses including Rheumatism, fever and stomachaches.

Mullen (*Verbascum densiflorum*)- leaves were mixed with Poke Root, Alum and Salt

Teas made from **Sassafras** (*Sassafras albidum*) or **Wintergreen** (*Gaultheria procumbens*)

Non-plant based practices- Leather strap or string worn around the wrist. A potato carried in a pocket. Cook Earthworms in grease and rub into joints. Wear a ring made of brass on both hands. Cut fingernails only on Wednesdays.



Native American Healing-

Headaches: **Wintergreen** (*Gaultheria procumbens*)- used to make tea. The tea was used to treat headaches, rheumatism and general aches and pains.

The Onondagas steeped **Pennyroyal leaves** and drank the tea to cure headaches.

Boils: **Witch-Hazel** (*Hamamelis virginiana*)- An Astringent, tonic, or sedative used in poultices, ointments, etc. The Iroquois made a tea of dried Witch-hazel leaves which was sweetened with maple syrup. Hot water poured over the leaves made a poultice for sprains, boils, etc. The leaves were applied as hot as the patient could tolerate. Steam derived by placing the twigs in water with hot rocks was a favorite Potawatomi treatment for muscle and joint pain.

Slippery Elm (*Ulmus fulva*) was used as a poultice for boils among other things. Stir one teaspoon of finely powdered bark into enough cold water to make a paste.

Yellow-Spined Thistle- The Kiowa Indians boiled Yellow-Spined Thistle blossoms and applied the resulting liquid to burns and skin sores.

Rheumatism: **Pokeweed**- Indians of Virginia drank a tea of the boiled berries. The dried root was also used to treat inflammation.

Bloodroot- A favorite remedy for rheumatism among the Indians of the Mississippi region- the Rappahannocks of Virginia drank a tea of its root.



Lesson Plan #2 - TREATMENT SIMULATION

'Health is worth more than learning' - Thomas Jefferson

Once students have selected a treatment for their ailment, students will next **simulate** the preparation of their treatments. A majority of these treatments will take one of three forms. First is a *decoction* which is a process involving the extraction of essential oils and various organic elements from some plants or herbs. Almost all approaches involve mashing and boiling the organic matter. Rather than simply steeping the material in hot water, a decoction involves boiling the organic matter and is likely to include several parts of a plant instead of just the leaves or roots or bark. Decoctions often require the patient to drink set amounts at certain times over a long period. Second, is a *tincture* which is a medical preparation consisting of an extract of a drug derived from a plant in a solution of alcohol. Small amounts of tinctures are often added to food or drink. Third is a *poultice*. A poultice, or cataplasm, is a soft moist mass, often heated and medicated that is spread on cloth and applied to the skin to treat aches, inflamed areas such as rashes or the pain of small cuts. For this simulation, I require the students to produce a recipe for the preparation as faithful to the original as possible. **This includes the names and measured amounts of the ingredients and detailed directions for preparing their treatment as if it were real. In early American households, recipes for treatments of all descriptions were written alongside recipes for food preparations; they were considered that important. This was not always the case for Native American or Slave Medicines. Formulation of these preparations will rely more on faithful ingredients and guesstimations of amounts.** Other, more readily available materials can be substituted for the real ingredients, but are measured and prepared according to the directions. In many cases the actual plant can be used, but when in doubt substitute readily available dried beans, seeds, spices or herbs for the more hard to find ones. I like to use non-flavored toothpaste for the basis of poultices- it takes organic materials well and looks and feels like the real thing! Other useful materials are: corn husks, plastic leaves and flowers, string or yarn (roots!), pencil shavings, pine cones, twigs and bark mulch. Use your imagination! I heat water in a kettle on a hot plate for the decoctions, use water instead of alcohol for tinctures and in preparation gather as many mortar and pestles, plastic bottles (no glass!), eyedroppers and measuring scales/ cups/ and spoons as I can! This is definitely a lesson in which more hands are better. Parent volunteers love to help out and offer

additional eyes and ears. In addition, practical precautions such as disposable plastic gloves, protective eyewear, paper towels, and oven mitts are all good ideas.



Poultice



Decoction



Lesson Plan #3- 'Garden Book' (Scientific Journal)

Thomas Jefferson to Charles Wilson Peale, August 20, 1811

"I have often thought that if heaven had given me one choice of my position and calling, it should have been on a rich spot of earth, well watered, and near a market for the productions of the garden. No occupation is so delightful to me as the culture of the earth, and no culture comparable to that of the garden. Such a variety of subjects, some one always coming to perfection, the failure of one repaired by the success of another, and instead of one harvest a continued one through the year. Under a total want of demand except for our family table, I am still devoted to the garden. But though an old man, I am but a young gardener."

Each team will be responsible for planting one example from their chosen list and to maintain a 'Garden Book' (Scientific Journal) of their own. Each team member will be assigned a different job which will rotate as little of often as you choose. In the past, I have delegated the following three jobs. **Record Keeper**- is in charge of maintaining a calendar of significant events (germination, leafing out, flowering, etc.), records of watering schedule and soil temperature and writes a description of changes over time. **Master Gardener**- creates the beginning soil mixture, regularly measures and adjusts the ph balance of the soil, measures growth rate of the plant, and researches and administers organic solutions for pests. **Scientific Illustrator** (Botany)- draws and/or paints the various stages of growth. Makes detailed (magnified) drawings of individual plant parts such as seeds, roots, leaves flowers/petals/berries.

I have each team plant individual plants in individual containers. If you are planting in a traditional garden or in raised beds it is important to leave adequate spacing between the plants! Individual pots (approx. 12") allows for flexible groupings. In order to insure the 'open pollination' of the original seeds, it is a good idea to purchase them from a reputable company specializing in heirloom varieties. The Seed Savers Exchange www.seedsavers.org is an excellent resource for purchasing seeds and the

history of heirloom varieties and the folks at www.heirloomseeds.com offer over 1400 varieties of herb, flower and vegetable seeds for sale. Of course once the original plants are grown and their seeds saved, future classes will not need to grow plants which are purchased- simple plant the seeds from last years class!



Original manuscript from The Corbridge Collection of Thomas Jefferson Manuscripts at the Massachusetts Historical Society.

Lesson #4- The Tradition of Seed Saving

With many thanks I acknowledge the receipt of the fine collection of seeds you were pleased to send me some time ago, and would have done this much sooner, were I not in daily expectation of receiving from London a variety of esculent vegetable seeds, that I wished to send you some of, at the same time. Having received them by the Ship Coramandal which arrived here a few days ago, I do myself the pleasure of sending you by the same mail that conveys this letter, some early cabbage & cauliflower seeds &c, shall send you by subsequent mails several other seeds for your spring sowing.

- letter excerpt from Bernard McMahon to Jefferson, Philadelphia, December 24th, 1809

Seed Saving also known as ‘brownbagging’ is the art of saving seeds from open-pollinated plants for use from year-to-year. The practice is as old as gardening and until fairly recently the traditional way farms and gardens were maintained. Open pollination is the key to seed saving. Plants that reproduce naturally adapt better to local conditions. Open pollinated plants are free of pesticides and genetic modification.

Two organizations of note that will be helpful in this endeavor are Native Seeds- www.nativeseeds.org and Fedco Seeds- www.fedcoseeds.com A wonderful online publication from Fedco is titled From Generation to Generation –an Activity Guidebook in the Living Tradition of Seed Saving by Eli Rogosa Kaufman.

A majority of the seeds harvested through this study will be ‘dry’ as apposed to ‘wet’. Examples of dry are chilies, beans, most herbs, tobacco and wheat. Wet examples include melons, squashes and tomato.

Choosing the right seeds for saving is very important. Seeds should be healthy and undamaged and should be free of other organic materials to reduce bulk of storage and the possibility of pests and disease. Step one in seed saving is cleaning the seeds. Several techniques are available for cleaning. Threshing means breaking up the plant material by beating or crushing it to expose the seeds. Winnowing separates the seeds from the rest

of the plant material using a gentle wind (blow on it!) or a fan. Slowly pouring threshed seeds in front of a fan over a tarp is another method. And as a best bet, separating the seeds by hand is always an option!

Once the seeds have been collected, allow them to dry thoroughly. Placing seeds on a newspaper or paper towel is NOT a good idea as inks and chemicals can easily transfer to the seeds. Make certain the seeds are dried in a place with good air circulation and away from direct sunlight. Under no circumstances should you try to hasten the drying process! (7 days in air conditioned environment).

Storing seeds in glass jars, envelopes or paper bags or plastic Ziploc bags (for freezer storage) are all good options. If not stored in the freezer, seeds should be stored in a dark, cool, dry place such as a refrigerator or closet. Ideal storage conditions are between 45-55 degrees with 25% humidity. As always proper labeling is important. I have the students wrap a label around their jars which includes the name of the plant, date the seeds were collected, and tips for growing the plants.





Lesson Plan #5- 'Useful Plant'

In 1800 in A Memorandum: Services to My Country

"The greatest service which can be rendered any country is to add a useful plant to its culture." - Thomas Jefferson

Begin by having the students select which type of new plant they would like to invent; vegetable, fruit or flower. Next have students research the definition of what their plant is. **A vegetable is- (an edible plant or part of a plant, but normally excluding seeds. The term usually refers to the root, stem or leaf of a plant.). A fruit is (in common language usage, 'fruit' normally means the fleshy seed-associated structures of a plant that are sweet and edible in a raw state). A flower (sometimes known as bloom or blossom, is the reproductive structure found in flowering plants. The biological function of a flower is to effect reproduction, usually by providing a mechanism for the union of sperm with eggs).** Next, have the students create detailed drawings of their plant including germination, root structure, leaf structure and flowers/berries. For inspiration, show examples of scientific illustration of botanical subjects which was a favorite pastime of the Victorian age. Several examples of contemporary botanical works can be found at the Monticello website at: <http://www.monticello.org/library/exhibits/lucymarks/gallery/exhibit.html>



Two important additions complete this portion of the assignment. They are- a written description of the plant complete with lifecycle and an explanation as to the 'usefulness' of their plant. Suggestions for the rationale could involve the yield of its cultivation, its nutritional value, and/or its medicinal properties.

Once their illustrations, descriptions and rationales are completed, the final task for each student is to classify their invented plant in scientific terms. For older students, I would require a more in-depth classification. For my fourth graders, I expect the following four elements: **CLASS**- either Angiosperm- plants which produce flowers or Gymnosperm- plants which do not produce flowers. **FAMILY**- These are plants with many botanical features in common. *The names of Families end in aceae. **GENUS**- This is the part of the plant that is familiar to most, it is the name given to a plant- I.E. Papaver (Poppy), Aguilegia (Columbine). *The name of the Genus should be written with a capital letter. **SPECIES**- This is the level that defines an individual plant. Often the name will describe some aspect of the plant; its flower color, size and/or shape of the leaves, or it may be named after where the plant was first discovered or by whom. *The name of the species should be written after the Genus name in small letters, with NO capital letters. An example of classification is for the Lesser Spearwort:

Class- Angiosperm
Family- Buttercup family
Genus- Buttercup
Species- Lesser Spearwort

