

# Building a Community Garden

## *Construcción de un Jardín de la Comunidad*



**A Collaboration of New Mexico  
Farmers and Educators**

# Acknowledgments

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# Contributors

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**Colin Baugh** was born and raised in the North Valley of Albuquerque, amongst the open fields, acequias, and Bosque. Graduated from UNM with a double major in Biological Anthropology and Religious Studies, and a minor in World Dance. Now helping in a non-profit organization A.I.R.E. founded by Miguel Santistevan, this vision and lifestyle has cultivated within him an undying love in helping to preserve and maintain these special spaces throughout New Mexico.



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**Pablo Lopez Tindeh** (Llanero Apache)/'Y'es'ka is a father, husband, and grandfather. He is the Na'ah'tan (speaker) of the Chunka Manitou Tanka Luta (Red Wolf Band of indigenous peoples) a local indigenous community in Albuquerque, New Mexico. He is an educator, currently completing his Ph.D at the University of New Mexico in Special Education/Gifted. Pablo is an organic gardener of the Red Wolf garden and greenhouse.



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**Travis McKenzie** was born in San Diego California and grew up in Cedar Crest, a small town located in the Sandia Mountains of New Mexico. He is currently a senior at the University of New Mexico studying Sustainable Agriculture, Alternative Education and Media Anthropology. Travis is also involved with the creation of Sembradores and A.I.R.E., mentoring youth in agriculture and seed saving. He has dedicated his life and his studies to working with communities and cultivating the amazing possibilities inherent in our mother earth.



**Sayrah Namasté** works for AFSC NM in its mission to protect land and water rights in New Mexico. Trained as a human rights worker, she spent six years with a migrant farmworker union, working against the exploitation of the people who provide us with food. A proud mother of an elementary student in the Albuquerque Public Schools, she coordinated the creation of this manual.



**Kristin Pazulski** lives in Denver, Co., and has her own part-time design business, which she uses to create pieces for the benefit of various nonprofits. ASFC is one of her pro-bono clients.



**Pilar Trujillo** was born and raised in Española, NM. She currently works for the New Mexico Acequia Association as Youth Coordinator for the Sembrando Semillas Program, which aims to create the next generation of acequia farmers. She also helps to operate her family's farm in Chimayó.



# Introduction



This curriculum offers an opportunity to explore gardening and farming as a hands-on learning experience. It has been prepared to assist the trainer, student, parent and community. As a trainer or mentor you will have the opportunity to take the participants from the planning aspects to the outside environment where they will be able to use different learning styles to meet their goals.

The curriculum follows the components of farming. It is rich in New Mexico culture and it is tied to sustainable agriculture. The curriculum is flexible, however, it offers lessons that can start in the fall with planning and finish with planting in the spring.

As participants watch the cycles of change with the seasons, they can observe the decomposition in compost piles and the rebirth of plants and trees in the spring. You will be offering living, hands on lessons though out the year.

The curriculum lessons are appropriate for multiple grade levels. Some of the lessons can be repeated year to year at different stages of the learning, planning and planting cycle. The lessons can also be extended through the summer vacation by offering the responsibility to families and community of maintaining the newly planted garden.

We offer pre-assessment questions at the beginning of each chapter. Our Crosswalk chart (see p. 66) lists the lesson plans in the manual and how they may be used as lessons in the Classroom Content Area. 🌱

## Agri-Cultural

BY JOSEPH C. GARCIA

New Mexico agriculture is the art, science and culture of growing food in a sustainable way that is respectful to land, water, animals and people. Why is it important to learn about agriculture in New Mexico? Growing food is the most intimate way of understanding what the patterns of nature are and how its life support systems work. New Mexico has a long history of people living and thriving in our arid climate because ever since people started growing food, they did so with respect and with an understanding of the natural world.

Our acequias, designed after the patterns of the human circulatory system, is the life's blood of New Mexico agriculture. Having an understanding of the watershed is crucial to growing food, fiber and raising animals. Observation of insects, animals, plants, wind, sunlight, temperature, shade, soil texture and soil structure are all learning opportunities about life that can be integrated into the group meeting space, which is not only a physical space, but a part of the Earth.

“ *The potential of this curriculum to inspire participants to pursue higher education, entrepreneurship, personal development and lifelong learning is unlimited.* ”

How is this relevant to the average student and their life? The answer is very relevant because everyone has to eat and what better experience can there be than growing, preparing and eating something that you grew? What can a student learn if they participate with the planting, harvesting, preparing and eating of their own food? Participants can learn and experience the universal pattern of reaping what you sow. Whatever goal a



student has for their life can be demonstrated by this principle. What the student puts into their education, social life and family life, is what they will receive. The planting of the seed can be compared to thinking of a desired goal. The caring for the seedling and understanding of its environmental conditions will help the plant (and idea) to mature and grow. Patience is required during plant growth and development just as it is for any well thought out goal to be accomplished. Then when it is harvest time, the student can walk out into their field, community, home, sport or even business with confidence, knowing that they did their part to produce good tasting fruits. The preparation and eating of the fruit is when the student is able to see the beauty, taste their accomplishments and reap the benefits of their goals. ➤

These life learning experiences in and from nature are not new. They were the first teachers in existence. The ideas and learning that comes from participation with the natural world is as fundamental as life itself. Nature is not something to run away from but to embrace. Nature is who we are, it is us looking into a mirror and saying “your beautiful.” As it is above, so it is below. There are many analogies to learn from in natural systems, we just have to be still, observe and then participate.



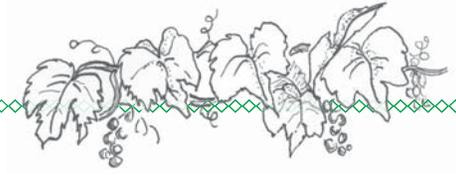
Barley field in Urraca, northern New Mexico

Samantha Mascareñas, youth participant, New Mexico Aequia Association

New Mexico is a place for enchantment and opportunity to learn more about ourselves as we learn more about nature because we are one and the same. Just as nature adds two blades of grass where there was once one, leadership and service (providing more habitat) is a natural tendency. New Mexico Agriculture is a way of life that when integrated into your education, adds ways of learning, knowing and being a true student of life.

The potential of this curriculum to inspire participants to pursue higher education, entrepreneurship, personal development and lifelong learning is unlimited. 🌱

# Planning



Objective: What do we need to include in a plan to start a community garden?

There is a lot of planning and many questions that have to be answered before a garden is established.

A network of people will have to work together with participants, trainers, staff, families, and the community, to decide what the garden will look like, what resources and materials will be needed and who will be responsible for creating the working environment.

As part of the plan, make sure the garden is included as a goal in the long range plans of your community. Keeping a time line of steps needed and steps accomplished can be displayed and used for the next years growing cycle.

Fundraising for seeds, supplies and equipment may also be a planning issue.

We will use the four “Ws”- who, what, where and when, for taking into consideration the mechanics of what it takes to set up a community garden. 🌱

# Planning



## Lesson 1

The trainer will open the discussion on the possibility of starting a community garden as a goal.

The trainer will ask participants to list resources that are needed to start a community garden.

### Vocabulary

Goal, families, community, resources, responsibility, material and supplies.

### Evaluation

Participants, with the help of the trainer will categorize resources.

### Extension

Participants will brainstorm ideas on how to organize resources.

## Lesson 2

Participants and trainer will identify teams how they will work together to share the planning and the responsibilities of a community garden. There will also be discussion on how a goal is reached. Several group meetings will be needed.

### Vocabulary

Planning, cooperation, collaboration, responsibilities, goals.

### Evaluation

Participants will begin a time line of steps needed to start a garden.

### Extension

Participants will begin to think about where they will fit into the plan.

### Objective

Participants will begin to learn about planning for a community goal within the group setting.

### Materials

- journals
- writing and drawing supplies

### Skills

- categorizing
- prioritizing
- collaboration
- communication

### Objective

Participants will identify garden teams and their responsibilities. They will also discuss how a team works together to set goals.

### Materials

- journals
- writing and drawing supplies

## Lesson 3

Participants will role play acting as different members. They will discuss the dynamics of a group working towards a common goal.

### Vocabulary

Communication, collaboration and group dynamics.

### Evaluation

Participants will be able to find an area of comfort in the dynamics of a group.

### Extension

Participants will think about the role they would like to take in the planning of the community garden.

## Lesson 4

In small groups, participants will explore their strengths and how they will fit into a group with the goal of setting up a community garden.

### Vocabulary

Strengths, team member and commitment.

### Evaluation

Participants will list responsibilities they are willing to take on to attain a common goal.

### Extension

Participants will decide their role in the garden planning. They will begin to think in terms of an action plan.

### Objective

Participants will gain an understanding of being a team member and working towards a common goal.

### Materials

- journal
- writing and drawing supplies

### Skills

- listening
- speaking in a group
- focus

### Objective

Participants will explore their strengths as team members.

### Materials

- journals
- writing and drawing supplies

### Skills

- exploration of personal strengths
- practice working in small groups
- commitment

# Planning

## Lesson 5

Participants and trainer will invite staff and administration to a meeting to present their plans, as well as preliminary steps for the community garden.

### Vocabulary

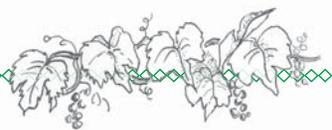
Organize, holding a meeting, presentation.

### Evaluation

Participants will present ideas and preliminary steps towards establishing a garden.

### Extension

Participants and trainer will meet to debrief after the meeting.



### Objective

Participants will learn to organize and hold meetings as a step in the objective of meeting a goal.

### Materials

- journals
- writing and art supplies

### Skills

- organizing
- holding a meeting
- presentation



# The Story of San Ysidro Labrador (Saint Isidore the Laborer)

BY SAYRAH NAMASTÉ

Every May in New Mexico, people gather together to celebrate San Ysidro Day. San Ysidro is the patron saint of farmers, and acequias, orchards, and farmlands are blessed through rituals, prayers, songs, and dance. This also marks the day when the danger of frost has passed so tender crops can be planted.



Original San Ysidro artwork © 2009 by Corky Frausto (www.corky.net)

The legend of San Ysidro has been told since the 12th century throughout Spanish speaking countries. Ysidro and his wife Maria de la Cabeza were poor farm laborers to a wealthy landowner in Spain around the year 1100 A.D. They were known to be humble and devout people. Ysidro and Maria went to Mass every morning at the Catholic church before going to work. Yet despite the lost hours in labor, the fields and plants were as well cared for as the other laborers.

This created jealousy and envy among the other farm workers, who complained to the wealthy landowner that Ysidro and Maria spent too much time praying. The landowner checked on them, and found that while Ysidro and Maria were praying at Mass, an angel was plowing their fields for them!

Many miracles are associated with Ysidro and Maria, who became saints after they died. Santa Maria de la Cabeza got her title (Cabeza means 'head' in Spanish) because an image of her head is often carried in processions in times of drought.

In New Mexico, people gather on San Ysidro Day and have processions, often starting at a church, to the farms and along the acequias. Branches of juniper and piñon trees are dipped into the acequia and then used to sprinkle the fields. We put flower petals in the acequias as a way of blessing the water. The songs, prayers, and dances reflect the many faiths and traditions here, including Catholic and indigenous.



This is one of the ways that the culture around farming is preserved and celebrated in New Mexico. 🌱



# Planning

## Who will be involved?

It is a good idea to have a team of people who have shared commitment, interest, experience, authority and contacts.

Some of these members may include:

- Participants, as active learners and owners of the garden
- Families are a large group who can play a vital role in the success of the garden. They can share their experience and expertise with building, demonstrations, teaching and marketing produce.
- Community can include media, TV, newspaper and radio
- Trainers, business owners and volunteers
- Local staff, administrators, nutritionists, cooks and custodians

Garden groups can be made up of participants and these members. Formal weekly or monthly meetings of these groups will be helpful in the continued success of the garden.

## What will be our goal?

A mission statement and objectives can be written at this point. This list can help to prioritize your educational and practical objectives and interests.

- Organic gardening requires management practices that include listing all procedures, substances, and identifying organic products for the prevention of commingling of organic and non organic matter. All information must follow a plan and be kept in a journal.
- Sustainable agriculture includes the goal of growing food that is healthy for people and the economy, while conserving and maintaining the environment.
- Nutritional food, creating an appreciation of agriculturally healthy food.
- Marketing produce as one of the final steps in a successful garden plan.
- Environment maintenance and conservation of sustainable agriculture.
- Content area, reinforcement and enhancement of the learning process.
- Life skills are learned in the planning and completion of a growing season. Skills that may be carried on to other projects.
- Business skill is the ability to formulate a sustainable garden plan.

## Where?

There are many characteristics that, together, make a suitable place for a garden.

**A garden needs at least six hours of sunlight a day.** Mapping the sun's trail across the sky during each season is helpful in the planning of the garden site. As seasons change your garden may be shaded by buildings or trees.

**Make your Garden site easily accessible.** A site near the meeting location would be perfect. It would offer all participants an opportunity to practice the skill of observation on a daily basis. A site within walking distance from the meeting place would be the next best thing. A walk can incorporate the garden sight with the encompassing neighborhood. Participants can observe the neighborhood plant life along the way and begin learning and asking questions before they even get to the garden.

**A garden should be a safe site for participants and visitors.** Some environments offer challenges when creating safe working and learning environments. There may be the concern of natural animals that could be destructive to seeds, plants and produce. Having the garden where parents and participants feel safe is important.

**Healthy soil is a key characteristic of the garden.** Getting the soil prepared for planting will include planning and testing. However, if it is too labor intensive, such as clearing trees or moving large rocks without the proper help or equipment perhaps another site may be available.

**Having access to a clean water source is another key characteristic of a successful garden.** You will need to figure out how to get water to your garden. You may need to use a pump or generator and hoses to get water to the needed area. The use of a drip system with a timer will ensure watering during vacations.



**Once a sight is established participants and volunteers can start to "map out" the garden.** Here are some considerations for mapping:

- Show direction
- Draw in terrain
- Water source
- Include fences, hedges, and paths
- Draw building or meeting areas you may want to include
- Planting beds

An exercise like "mapping" will encourage the practice of observation, planning and conversation between the members of the group.



# Planning

## Lesson 6

The trainer will enhance the lesson with examples of garden maps. This will begin the discussion about what will be included in the map. The maps will be presented to the garden group of volunteers.

### Vocabulary

Direction, terrain, fences, hedges, paths, water source, on site buildings, meeting area and work tables.

### Evaluation

Participants will work in small groups to begin drawing garden maps.

### Extension

Participants will present maps to the whole group, and then, the garden group of volunteers. Together they will begin the process of working on the final map.

### Objective

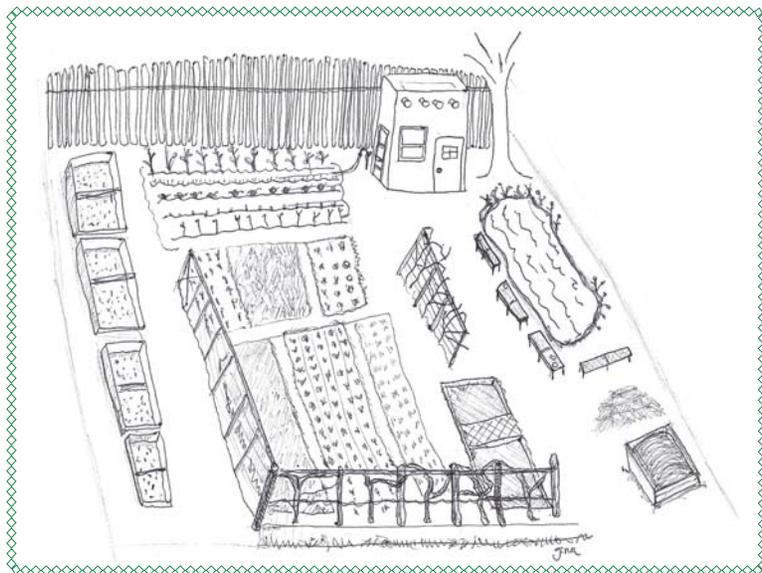
Participants and garden group will begin to discuss and practice "mapping out" the garden.

### Materials

- journals
- writing and art supplies

### Skills

- measuring (possibly according to scale)
- direction
- rough draft drawings
- compare and contrast



## How do we start?

Organization will be key in the development of the garden. Having a garden manager and a team to help carry through with trainings and schedules will help streamline the process. A Garden Club can work together to set up charts, timelines and monitor progress.

Points of consideration follow:

- Responsibility — who will manage the garden.
- Training monitors — older participants can help younger participants in the garden.
- Scheduling, this can include the tasks and then the rotation of tasks for each group or individual involved.
- Group responsibility for assigned garden areas.
- Formal meetings for collaboration.
- Fundraising for seeds, equipment, and tools.
- A marketing plan must be set in motion to assure that the final steps have the funding they may need to complete the project.
- Rules can help to solve a problem before it starts.
- Security for participants, parents and the garden is an issue to take into consideration.

## When do we start?

These lessons offers many opportunities to use the garden as a learning environment. The timeline may depend on working the lessons of the garden into the demands of the participant's schedule, fundraising, or the weather.

The components of gardening can be studied as parts of the whole and later be put into practice in the garden. Have participants ask their families about seasonal gardening. Or they can do research in gardening around the world. If they are curious new ideas will be available for hands on learning.

Once an organized group and a garden area is established your garden is well on its way.

If you choose to plant in the early fall you will be able to grow different vegetables through out the year. Some of the biennials such as chard, kale, and spinach can be have a second harvest in the fall and will grow though the winter if they are covered. This winter bounty may not be as pretty as in the summer, but they are just as edible.

If your garden is affected by an early frost, you can note it in your journals and study the weather patterns for your area. Remember you can start your compost piles in any season. 🍄

# Planning



## Lesson 7

### Organization of the Garden Group:

The whole group will break into small groups for the purpose of defining responsibilities, work charts, schedules, rules, fundraising, and a marketing plan. This process will take several meetings.

### Vocabulary

Defining responsibilities, work charts, schedules, rules, fundraisers, and marketing plan.

### Evaluation

After several working sessions, the organization of the garden will become a working plan.

### Extension

Decisions made by the team will be put on charts for display in key community and garden areas.

## Lesson 8

### Tools Needed:

Participants as part of the garden group will research, discuss and make decisions about the type and number of tools needed. They will also discuss and plan how to obtain the tool they will need.

### Resources

Community support

### Evaluation

A list of tools needed will be generated, as well as resources that will help obtain the tools.

### Extension

The list will be presented to possible resources and the needs will be met.

### Objective

As a group the participants and Garden Group will work together to organize, responsibilities, work charts, schedules, rules, fundraising and a marketing plan.

### Materials

- journals
- writing and art supplies

### Skills

- small and large group collaboration
- commitment
- responsibility

### Objective

As part of a garden group, participants will list tools needed and ideas as to how to obtain them.

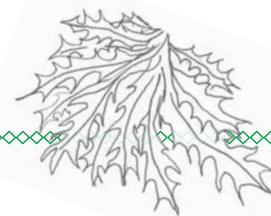
### Materials

- journals
- research materials such as catalogues, price listings
- internet access

### Skills

- research
- discussion & decision making

# Preparing



Using the map of the garden, make a list of what you have and what you need. Remember a marketing plan is important when planning your garden. Fundraisers may be necessary to take your plan from the first step to harvest.

Points to consider:

- Water: Is your supply of water reliable, clean and accessible? Will you need equipment to get the water from the source to the garden?
- What type of irrigation will you use? And will you need training and/or supplies?
- Predators: Are there natural animals that live around or in the area of your garden? Will you need to put up a fence to keep them out?
- Equipment and supplies: It is good to be able to estimate how many people will be working in the garden at a time and plan accordingly. Some tools may be borrowed from parents.
- Will you need storage for tools and equipment?

After all the planning and organizing, your group will rejoice at the chance to go out into the garden and get to work. The maintenance of the garden should be pleasant and easy.

It's a good idea to check the moisture content of the soil before any digging or measuring begins. Digging into muddy soil can damage the soil's structure and leave dirt clods. If the soil is too dry, you may have to add moisture and wait for the desired moisture level. Test for the correct moisture by squeezing a handful of soil. The soil should hold together, and fall apart easily when touched. ➤

# Preparing



Measuring and marking the boundaries of the garden will encompass many of the content areas of the activities and participants will love the hands on learning. As participants measure and mark the outer boundaries of the garden they can mark them with wooden stakes pounded into the ground, and tie string from stake to stake. Then, participants can begin to measure planting plots as well as the different maintenance areas in the garden.

Plant beds are a good place to start the digging.

When establishing a garden, digging into the soil up to 12 inches deep will loosen the soil. Mixing compost into the soil at this time adds the nutrients and builds the soil for the seeds, it will also improve drainage. All of this will help roots establish themselves by allowing them to grow downward instead of spreading.

Raised beds are recommended because they are easy to construct and maintain. Use > treated lumber (2'x8x8") to build a rectangle (4'x8') frame work for the sides of the raised beds. Plan the size of the beds to fit the size of your arm's reach. To fill the raised beds, dig the soil and add compost. You can use the top soil you may dig away for paths to help fill the beds.

If you plan to use commercial soil to fill the bed, plan on about 14 bags to fill the 4'x8' container. The most important rule is never walk or kneel on the raised beds because compacted soil will contain less air and this will seriously impact root expansion.

It is nice to have a raised bed or an individual plot for each small group. Individual plots can also be used as experiments, demonstration or rewards.



If you decide to plant directly into the ground the same process will apply. Mix compost with top soil and plan paths that are a yard wide to accommodate passing foot traffic and wheelbarrows.

Compost heaps can be placed close to the planting beds.

A table with shade for holding seed beds, repotting or demonstrations is useful.

Include signs and labels with plant names, plant information, nutritional value, assignments and research.

If you have limited space, seasonal weather, or security worries a moveable garden can be planned. Planters of different sizes can be loaded onto a wagon and moved into sunny areas.

Remember to include participants in all decisions and when possible with all stages of work.

## Traditional Gardening

Native plants that grew wild in northern Mexico were the food source of the hunters and gatherers. Hunters and Gatherers were prehistoric nomadic tribes that wandered north from Mexico. As they selected and saved certain seeds, plants like corn developed. Kernels of corn were found in a cave in the Gila Mountains in southwestern New Mexico. Some of the corn kernels were carried by traders and indigenous people migrating north from Mexico. Evidence shows the first farmers planted in flood plains and used creeks to water the plants. The need for people to wander in order to find a food source was no longer necessary once a garden as a permanent food source was established. Through time, gardening and watering techniques developed according to the needs of the farmer. Evidence of the following techniques has been found in New Mexico.

## Waffle Gardens

Waffle gardens were most common along the Rio Grande valley. The gardens were built in a series of 3'x3' grids. The grids were made up of planting beds surrounded by low clay borders. The borders were used to hold water for the growing plants. >



# Preparing

## Terrace Gardens

Terraced gardens were planted and then layered with rocks placed loosely in rows to hold or slow water run off, and maximize water absorption. Evidence of cultivated terraced gardens has been found in arroyos in the Sandia Foothills.

## Cobblestone Gardens

Cobblestone garden were used by pueblo people in northern New Mexico. Stones were used to form the boundaries of the gardens, and smaller stones were used to fill in the area around the plants being cultivated. By using stones, water evaporated at a slower rate and the solar heat absorbed extended the growing season.

## Companion Planting

This technique is also known as the Three Sisters. Squash, corn and climbing beans are planted close together. The corn stalk provides a structure for the beans, and the squash will provide ground cover to prevent weeds and help retain moisture.

## Ollas

As the Spanish colonists settled in New Mexico they brought techniques for gardening with them. The use of "ollas" or large unglazed clay pots were buried in the gardens, leaving only the small openings above ground. The pots were filled with water and as the water seeped from the pots it provided water for the plants.



## Acequias

Acequias are a system of irrigation ditches used to move water to gardens. The gardens are traditionally planted in long furrowed rows. Acequias have been used by the pueblos along the Rio Grande valley before the arrival of the Spanish colonists. 🌱

## Lesson 1

### Laying out the Garden Site Boundaries:

Participants and volunteers will measure the area for the garden and use stakes and string to mark the area.

### Vocabulary

Measure and boundaries.

### Evaluation

The garden area will have marked boundaries.

### Extension

The participants and volunteers will divide the garden area into the different work spaces.



### Objective

The participants and volunteers will start to prepare the garden area using the map developed in previous lessons.

### Materials

➤ Materials and supplies will be determined by environmental needs and by available funds.

### Skills

- measuring and marking area
- dividing area into different work spaces

# Preparing

## Lesson 2

### Laying out the Planting Beds:

Trainers and experienced gardeners will lead small working groups to complete the tasks. (This will take several working times.)

### Vocabulary

Collaboration, completion of tasks.

### Evaluation

Working collaboratively to complete tasks.

### Extension

Groups continue to work to complete tasks.



### Objective

The participants and the volunteers will begin to build the planting beds and compost piles.

### Materials

- the materials and tools that will be needed will depend on the method of planting (raised beds or ground level planting).
- the compost will depend on the method and the materials available.
- commercial soil may be used if composting material is not ready for the garden.

### Skills

- working in small groups
- measuring and building skills
- using tools properly
- following directions



# Soil

### Pretest Questions

1. What does organic gardening require?
2. What is sustainable agriculture?
3. How would you define soil quality?
4. Why is a soil test recommended?
5. Why is compost added to garden soil?

Soil is made up of different sized particles of sand, silt and clay. It also has particles of decomposing animals and plants. The decomposing plants and animals feed tiny organisms that live in the soil. Along with soil management practices, the soil in our garden is ready to grow healthy plants.

### Soil Analysis

Fertile soil is a balance of sand, silt and clay particles. The percentage of each particle will determine the soil type. In order find out what kind of soil you have in your garden a good place to start is with a soil analysis.

The analysis will provide information on the nutrients in the soil. Contact your County Extension office and ➤



# Soil

they will show you how to take a soil sample from your garden. They will tell you where to mail the sample and the laboratory will send you the results. Then the agent will help you decide what you need to add to your garden's soil for optimal fertility. By comparing the results from year to year you will be able to tell if you are accumulating or depleting the soil nutrients.

## Compost

Compost is an excellent way of adding nutrients to the soil. Compost is organic matter that is made up of small pieces of plants and animals that were once alive. Compost also helps hold air and water needed to maintain and improve the biological and physical properties of the soil.

As a management tool in soil fertility and organic gardening the benefits include:

- Improve soil structure
- Increase moisture retention
- Helps to release nutrients for plants
- Provides food for micro organisms in the soil
- Helps to suppress disease



Chimayo, New Mexico

Pillar Trujillo

## Cover Crop

Planting a cover crop between planting cycles is an important strategy for preventing nutrient and soil loss. Cover crops improve the nutrients in the soil, and are also used as weed and disease protection in the garden.

The type of cover crop will depend on what you want it to do:

- Add nutrients, such as nitrogen
- Build soil structure by adding biological activity
- Prevent soil erosion
- Provide mulch to conserve water and improve drainage
- Suppress weeds, pests and disease
- Provide a habitat for beneficial insects and spiders. 🕸

## Lesson 1

1. Divide group into small groups or individuals.
2. Fill each jar 2/3 full of water.
3. Add soil samples until the jar is almost full.
4. Put the lid on the jar.
5. Label each jar with the location the soil was collected.
6. Shake the jars vigorously. Let the soil settle.
7. Observe how the soil begins to separate.
8. Place jars where they will not be moved and can be observed for 24 hours.
9. The soil will separate into levels of clay, silt and sand.

## Vocabulary

Sequential directions, samples, labeling and percentages.

## Evaluation

Participants will label and compare soil levels.

## Extension

Participants will compare soil content levels between samples in jars.



## Objective

Participants will classify the soil in the garden area and determine its quality. Participants will compare their soil samples after they settle into levels.

## Materials

For each small group:

- one glass quart jar with lid
- Markers
- soil samples from different areas of the garden - taken from about 2 inches below the surface
- water

## Skills

- following sequential directions
- collecting samples
- labeling



# Soil

## Lesson 2

Participants will determine the averages of sand, silt and clay content in their soil sample. They will then compare it to loam, which consists of 40% sand, 40% silt and 40% clay.

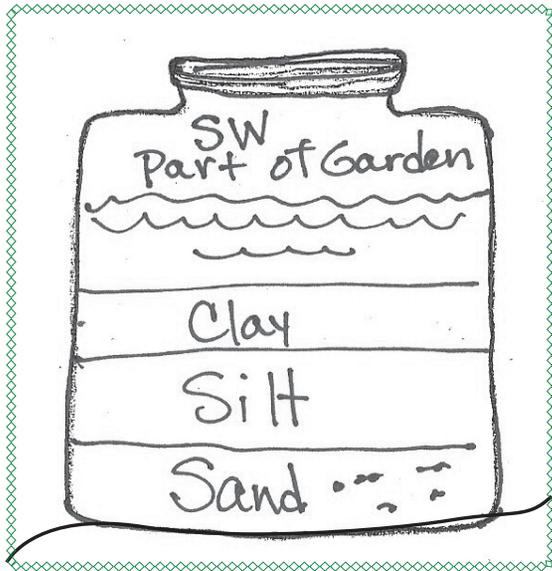
Participants will add organic material and other soil to make their samples more like the ideal soil example of Loam.

### Evaluation

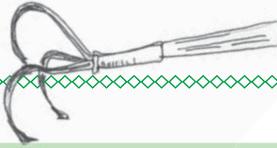
Participants will gain an understanding of soil content and the part it plays in water and soil management.

### Extension

Participants and trainer will begin the discussion on the mechanics of compost.



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### Objective

Student will compare their soil samples taken in lesson 1 to a loam content average.

### Materials

- soil samples taken in lesson 1
- access to the garden soil and outside organic material
- journals
- writing and art supplies

### Skills

- compare
- observation
- averages
- charting

# Water

### Pretest Questions

1. What is the role water play in photosynthesis?
2. Name three ways of irrigating a garden.
3. Why would you use deep irrigation as opposed to shallow irrigation?
4. Explain the water cycle.

**Objective:** Participants will gain an understanding of the role water plays in a garden and the water cycle.

Water is an essential element for all living things. We need clean water in order to maintain health, as well as maintain the growth of strong plants.

Plants need water, air and sunshine in order to make their own food. The water absorbed by the roots carries minerals up the stems and into the leaves. Some of the water that enters the plant evaporates and some of the water is used to build plant tissue. The water that stays in the plant cells keeps the leaves firm, helps to regulate temperature and stores minerals. This process that allows plants to make their food (starch and glucose) is called photosynthesis.

The water used in a garden will dissolve the nutrients in the soil so that the roots can absorb them. The amount of water needed will depend on the water retention of the soil and the climate. Too much water will fill the air spaces in the soil, weaken plants, and make them susceptible to disease. Most gardens should be deeply watered once a week. This can help to establish plants with deep roots. Watering daily may cause the plants to grow shallow roots that will dry quickly. ➤

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# Water

## Irrigation

There are different types of irrigation or ways of watering gardens.

- Overhead Sprinkling: The gardener uses a hose and a sprinkler to water the garden. Use this type of watering only in the morning.
- Flood Irrigation: Watering the garden by flooding the entire growing area.
- Slow Drip Irrigation: An irrigation system made up of hoses and a timer to deliver water by drip to the base or root of the plant.
- Furrow Irrigation: The process of allowing water to irrigate the garden by flowing through the furrows between the rows of plants. This method is traditionally used in New Mexico.
- Harvesting Rain: Capturing and storing rainwater, for use when needed.

Water early when temperatures are cooler as this will slow evaporation. Covering the ground with organic material, (mulch), or inorganic material (fabrics), will also slow evaporation.

## Water Cycle

Do you know that the total amount of water circulating through the water cycle never changes? The water cycle purifies and circulates water from the atmosphere to plants and animals and then back to the atmosphere.

The parts of the water cycle are:

- Precipitation — when rain, sleet, hail or snow falls from the sky.
- Run-off — when the water that falls on land flows to other places.
- Evaporation — when the water vapor floats into the air.
- Transpiration — when water is taken in and breathed out as vapor, returning to the atmosphere.
- Condensation — when the water vapor that leaves a plant turns into drops.

During the cycle, water shifts from gaseous to liquid and to solid states. ➤

## The Acequia System

Acequia is a Spanish word for “irrigation ditch.” Acequia Systems, or watering systems are a traditional way of maintaining a farm ecosystem that provides water for indigenous plants as well as crops. Acequias are a series of trenches used to connect and transport water from the mountains, rivers, reservoirs, and natural springs to the farmer’s fields.

Pueblo farmers had an acequia system when the Spanish farmers arrived in New Mexico four centuries ago. The Spanish farmers came to the region with the knowledge of the acequias used in Spain. They divided pieces of land called suertes (luck) and worked with their Indian neighbors to establish the irrigation system.

The Spanish farmers used gates to hold water back so that one field at a time used the water. The Pueblo farmer had communal plots and there was no need for gates. They both allowed water to be shared equally. Traditionally, water was measured by time and not by volume. In this way the flowing water played a part in the water cycle.

Roads or trails along the acequias were used to get from village to village. Ninety percent of the original acequias are still in use and have the names of the founding families.

It is said in Northern New Mexico, “The water belongs to the earth and the earth belongs to God”. 🌱



Acequia de la Cañada Ancha, Chimayo NM

# Water

## Lesson 1

### Water Cycle

*Discussion:* Trainer will present information on the water cycle, using pictures and stories. Discussion will follow to reinforce understanding.

Participants will draw pictures of the water cycle, using a circular shape and arrows.

### Vocabulary

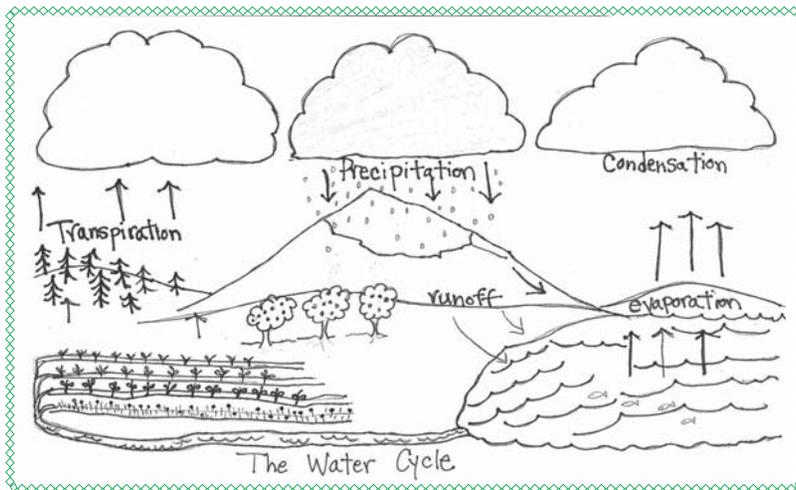
Water cycle, evaporation, transpiration, precipitation, erosion

### Evaluation

Participants will begin at different starting points to explain the water cycle. Plants will be included in the explanation.

### Extension

Participants will string the colored beads to represent the different stages of the cycle. Example: Yellow = sun, clear = rain, gray = clouds, brown = erosion, blue = lakes or oceans, green = plants. Participants will tell the story of their bracelet.



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## Lesson 2

### Transpiration

*Discussion:* How does water enter the plant? Why do plants need water? What does a plant do with the extra water it takes in? How does this fit into the water cycle?

1. Transplant mature plants into containers and fill the container with soil
2. Label containers
3. Participants will pour equal amounts of water into each container.
4. Have participants place one of the plants and the container with only soil in a plastic bag and seal. Cover the last plant with a bag only to its base and secure.
5. Place containers in the sun or bright shade, for a few hours. The plant may burn if the area is too hot.

### Vocabulary

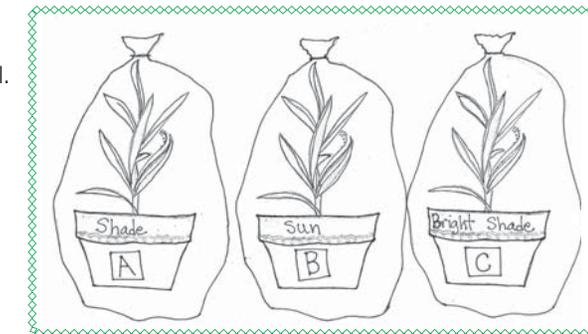
Transpiration, Evaporation, Water Cycle

### Evaluation

Participants will compare containers and discuss the amounts of water collected on the bags in the context of transpiration and the water cycle.

### Extension

Participants will discuss and compare the amount of water evaporation from soil, from plant and from plant and soil.



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### Objective

Participants will demonstrate an understanding of the water cycle.

### Materials

- colorful string, yarn or leather
- colored beads
- journals and art supplies

### Objective:

Participants will witness how excess water leaves a plant and returns to the atmosphere.

### Materials:

- two identical mature plants (per group)
- three containers
- soil for containers
- plastic bags to fit over plant and container
- plastic ties for closing bags
- one measuring cup
- water
- journals and drawing supplies

### Skill:

- observation
- comparison
- charting
- reaching a conclusion

# Toh/Water/Agua Ta'tan'ka Mini Wa'kan Hok'chila Water Buffalo Boy

BY PABLO LOPEZ

Generally, within American Indian philosophy and cosmology, water is one of the four precious elements. The four precious elements are fire/water/earth (stone)/air. Without any one of these elements, life would not exist.

American Indians have practiced using stories/visions/dreams to guide their decision-making about future events and/or ways of conducting themselves in relationship to the Earth. Stories were told and used as fables, teachings, myths, parables and legends to the younger generations in order to preserve a "way of thinking" and a way of abiding to "Natural Law." Oral histories and stories were used to present ideas, beliefs, notions and concepts. Each story, legend or fable allowed the younger generation to critically evaluate their relationships to their surroundings, their families and/or a cultural value. In addition, these stories presented events and conditions for them to problem-solve. One condition was to learn to coexist in a harmonious relationship with their eco-systems and traditional homeland, and location.

The story of Water Buffalo Boy serves to remind us, as human beings, of the preciousness of water and what it means to all life on Spaceship Earth. This myth presents an apocalyptic event not as a punitive teaching but as a forecast to proactive measures so that we can critically evaluate our need to protect this precious element, not only for the present but for future generations. The story also allows us to pose the question on what we, as human beings, need to do in order to protect this precious element. This fable of the poisoning and eventual disappearance of water should stimulate each one of us to unite in defending this primary requisite.

## Ta'tan'ka Mini Wa'kan Hok'chila

In a remote high desert Pueblo, in between now and then, isolated from the modern world, an event occurred that would bring extinction to life on the Earth: the arrival of a young boy and a gift of water. The young boy also brought with him a forewarning to society that this precious gift would soon be leaving them as mysteriously as it had arrived. Theories of volcanic activity, hypothesis of ice comets, scientific method, modern philosophy, psychology, war, modern weaponry and prayer could not change destiny and fate.

When Water Buffalo Boy first arrived, most of the people in the Pueblo didn't care where he came from. In the people's memory, Ta'tan'ka Mini Wa'kan Hok'chila had always been part of the community. He is us! He is a vibrant, beautiful young person. He brought great joy and good feelings to most of the people of this isolated highland desert community. "He is a gift to us," said the Elders, wise women and men of the community. Water Buffalo Boy brought with him water and rain to this dry, desert community. With rain came more animals, agriculture, herbs, desert medicine and bountifulness. The Jaras were full. The arroyos were full. In the people's memory, time wasn't relative, it was absolute. Yesterday, today and tomorrow were all rolled into one continuous moment. >

However, there were the skeptics and nay-sayers. The skeptics in the community questioned who he was and where he came from. Those weary of good fortune and those that believed that nothing was free and all things must be paid for were all met with silence. Do we question the Sun and where the power of the heat and warmth comes from? Can we charge for the air that we breathe? As men, we have a tendency to guess and call it fact. We create laws to benefit one person or another. In each of our short life span here on earth, we must come to terms that our time is relative, but death is absolute.

Ta'tan'ka mini Wa'kan Hok'chila behaved in a manner beyond his appearance of 11 or 12 years old. Water Buffalo Boy understood unequivocally that all life forms on this earth are united in the need for water, man/woman, plants, birds, four legged animals, fish, whales and even bacteria. Nothing can survive without this gift of life. His a-priori position was that there should be no country, political barrier, culture, government and religious denomination that had the right to prevent and prohibit any life form from drinking and supplying their need for water.

Inevitably, the day of reckoning was upon us. In that faithful year, when the Earth was making her yearly trip around the Sun, Water and all its magical forms were beginning to disappear. One half of the precious element, Hydrogen was being ejected into the atmosphere, or that's what those with scientific knowledge were saying. Newspapers, reports, TV, all communicated that this mysterious and concluding phenomenon could be prevented from happening. This was untrue. All people, from all places of the world were subjected to a sudden lack of water. All people were forced to strictly conserve and use the remaining water in ultra management.

Water Buffalo Boy was here only to witness the change and to bring one final gift of water. He had many buffalo horns that would magically fill with water. He gave these buffalo horns to special humble and charitable people. When these special people put their hope into their request, the horn would fill with water. Nonetheless, who were these special people? Could there ever be enough horns to satisfy the needs of so many people? Only the following days could unravel this mystery. He would stay to see how this story unfolded. 🌿



# Acequia and the Seasons

BY AARON MOORE

"C'mon Sam!" I yelled back as I pedaled down the road as fast as I could. It was summer. We had just moved to Bernalillo, a little town outside of Albuquerque. Our new house was less than a mile from the Rio Grande. We were going to go play in the willows down by the river. We spent many hours exploring the wildlife habitat that thrived around the river and the acequias. The river scared us, but the acequias were smaller. There were bridges going over them and walkways. The number of animals and insects that lived around the acequias was incredible.

When we got to the river, we jumped off our bikes and ran into the willows. We dreamed we were in a fort. We built sleeping areas, and pretended we were hikers, and hobos. We walked to the river and dreamed about building a raft like Huckleberry Finn. We wondered where all the acequias went. Some were huge. Others were small. The acequias astounded us, but we knew they could be dangerous too, we might drag a stick through the water, but we stayed dry and on the shore. We knew that the acequias were used to water crops. They were very important to farmers in the area.

When we went back to the acequia, we noticed all sorts of bugs on the water. We spent hours watching them as well as the, spiders, prairie dogs, and other animals around the acequias and the river.

One day, as it had just started to get cold outside, my brother and I got on our bikes and headed out to hang with the frogs and water bugs at the acequia. We rode a long time and then we parked our bikes and started to head up the embankment, but a surprise awaited us when we got to the top. The acequia was empty!! The sandy bottom of the acequia looked fun to play in and spent all day in the sandy bottom. The acequias that were used to water plants that grow food were dry now because of the harvest and the change of the season. After it gets cold, farmers take some time to ready the soil for the next season's planting and don't need water until the spring.

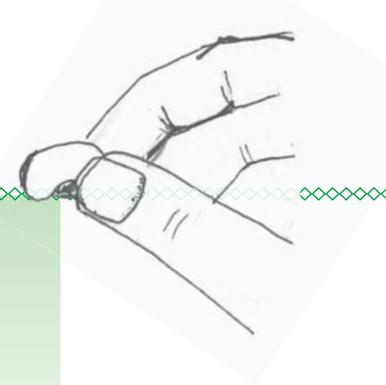
With the understanding of the great importance the acequias held for us, we realized they were a life stream that watered the plants that help feed us. We had more respect for the acequias and for the seasons. 🌱



Annual cleaning of the acequia

New Mexico Acequia Association

# Seeds



## Pretest Questions

1. What is the life cycle of a seed?
2. What are the different types of plants grown from seed?
3. How do the life cycles vary between seed types?
4. What do seeds need to grow?

**Objective:** Understanding the life cycle of seeds and the importance of getting strong healthy seeds.

There are three types of plants grown from seed:

**Annuals** are plants that complete germination, grow, flower and produce seed all within a single year.

**Biennials** are plants completing their life cycle in two years. During the first year the plant grows. The second year the plant will give fruit. Propagation by seed is needed for reproduction.

**Perennials** are plants that will live more than two years. The plants will grow, flower and produce seeds each year. They may live from three to thousands of years. ➤

# Seeds

## Environmental needs of seeds

There are environmental needs that are involved in order for a seed to germinate.

All seeds need a maximum-minimum and a perfect temperature range to grow.

All seeds need moisture delivered through the soil in order to germinate.

All seeds need aeration. When planted, this allows oxygen to enter and carbon dioxide to dissipate and move away from the seed.

All seeds need light to grow (photosynthesis). Some seeds need light to germinate.

Once the seed is planted and watered, it breaks open or germinates. A root grows down into the soil and the stem grows upward. As the seedling grows, the leaves can begin to make food for the plant. This is called photosynthesis. When the plant has grown, flowers will bloom.

Some plants need insects and birds to seek nectar from the flowers. As they drink the nectar from the flowers of the same kind of plant, they will mix the pollen. Then the flowers are ready to produce fruit. Some trees and grasses use the wind to move the pollen. They do not have big colorful flowers because they do not need to attract pollinators. When the flower dies the seeds grow inside it and the fruit forms around the seed. When the seeds or fruit fall to the ground they have the potential to become new plants.



Seeds obtained from the community will be well adapted for the climate. Seeds from the community are often shared and are taken from only the strong healthy plants. Check the expiration date and growing zones of seeds that are purchased. You can germinate the percentage of viable seeds to make sure they are still able to produce.

The size of the seeds will determine if they can be planted directly into the garden. Smaller seeds may need to be planted in seed beds. A seed bed may be a box or a seed tray in the meeting space or nursery. The tiny plants will need thinning and hardening off before being transplanted into the garden.

The process of hardening off seedlings is to place them outside in the shade for a couple of hours and adding two hours each day. The process may take up to two weeks. When planting larger seeds the general rule is to plant them three to four times as deep as the diameter of the seed. Gently firm the soil over the newly planted seed and water. 🌱

# Talking to Seeds

BY SAYRAH NAMASTÉ

Every spring and fall, my daughter Marsaya and I plant our garden. We just grow enough to feed ourselves and friends who might come over for dinner. When we choose our seeds for planting, we think about what we like to eat. Marsaya likes to grow mint; it's very easy to grow and spreads all around our garden (and sometimes into the neighbor's gardens!). She chews the mint like it is candy, and we make mint tea and bake the mint in cookies too. We also grow salad greens, arugula, tomatoes, bell peppers, eggplants, and other vegetables that we know we like to eat. When Marsaya was very young, she would get excited when the plant began to flower and often picked tomatoes, bell peppers and eggplants before they were ready because she was so happy to see them become a fruit.

On the day we plant, after we loosen the soil in our garden, we take the seeds out and decide where they will go in the garden. It is fun to look at the different sizes and colors of the seeds. We know the seeds are alive. Before planting them in the ground, we place the seeds in our mouths. We are communicating with the seed.



We want the seed to know our bodies' chemistry so the seed will know how to grow to nourish us. This is an old tradition, and we like to continue the custom. After a few minutes, we take the seeds out of our mouths. Now they are moist and we have communicated with them, so they are ready to be planted. Throughout the season, we care for the seeds as they become our food. And Marsaya knows she has a special connection with the food that she has grown. 🌱

# Seeds

## Lesson 1

*Discussion: What do seeds look like under ground? Do different plants types look different under ground? Why do plants have roots? With the root boxes, we will be able to observe plants as they grow beneath the soil.*

1. Fill boxes with soil.
2. Plant seeds against the rigid plastic window and label them.
3. Roots grow away from light, so cover seed windows when you are not observing the roots.
4. Water the plants as needed.
5. Observe root growth weekly.

### Vocabulary

Tap and fibrous root

### Evaluation

Participants will observe and draw root growth. They will compare the different types of roots.

### Extension

Participants will take plants from containers to examine and measure root systems and record growth in journals.

### Objective

Participants will observe tap and fibrous root growth, function and variation.

### Materials

- four containers with at least one clear side (a\* root box can be constructed from a milk carton and a piece of ridged plastic.) Plastic cups or jars will also work nicely.
- carrots, lettuce, radishes, marigolds, wheat seeds
- potting soil
- labels
- journals

### Skills

- building or constructing
- discussion
- observation

## Lesson 2

*Discussion: Plants need air, water, sunlight and nutrients. Plants get nutrients from the soil. Do you think different types of soil affect how a seed and plant grow?*

1. Fill containers with different soils. Make sure boxes have drainage.
2. Label pots.
3. Pour equal amounts of water into containers, observing and comparing the soils' water holding ability.
4. Plant equal amounts of seeds in each pot.
5. Observe the differences in germination and growth.

### Vocabulary

Types of soil, nutrients, planting, labeling, observing

### Evaluation

Participants will successfully plant seeds, label and set containers outside or by a window for observation.

### Extension

Participants will chart the time of germination and growth of seeds.



### Objective:

Participants will observe how plants grow in different soil types.

### Materials:

- five planting containers per small group
- corn seeds
- soil mix, sand, silt, clay and compost
- labels
- journals
- writing and art supplies

### Skill:

- observation
- following directions
- charting

## Creating Root Boxes



1. Cut, the side from a half gallon milk carton.
2. Cut out a window leaving about ½ inch of carton between the corner and the window.
3. Cut a piece of rigid plastic and place it into the carton to create the window. Use water proof glue to secure the plastic window.
4. Once planted, use a small block to tip the carton forward. Roots will grow straight down and the slant of the carton will keep the roots against the window.

# Seeds

## Lesson 3

### Seed Pots

*Discussion: Native American farmers use clay pots with tiny holes for the openings to save seeds for another growing season. Why were the containers designed with small openings? (to protect seeds from rodents, insects and mildew) Why were seeds collected at the end of a growing season? What are some characteristics of saved seeds?*

1. Participants will use the clay to pinch into shape 2 small half round shapes of a bowl.
2. Participants will use a pencil point to make a small opening in one of the pieces. The opening should be large enough for the seeds being saved to fit through.
3. Participants will put the two half round shapes together to form a container. Participants may design their desired shape.
4. Once the containers have dried participants may put their seeds into the containers for safe keeping.

### Vocabulary

Seed pot, Native American, container, pinch pot

### Evaluation

Participants will have constructed a seed pot using clay.

### Extension

Participants will scratch designs into seed pots to add personal stories.



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### Objective

Participants will learn how to save seeds using a seed pot.

### Materials

- pictures of Southwest Native American seed pots
- clay, natural if possible
- seeds
- journals and art supplies

### Skills

- history research
- clay construction
- design and planning of container

# Que vivan las semillas!!!

BY TRAVIS MCKENZIE

Seeds sprout, and grow, and reproduce, just like us as humans. I feel everyone has an Agrarian Heritage; everyone has someone in their lineage (their family tree) that tended the land, planted seeds, and harvested to feed themselves and their families. Saving seed becomes the manner in which we continue that which was given to us, it is the way we stay connected and learn more and more about the process of planting, the process of becoming connected with the earth, and ultimately the process of life.

A key moment that shaped my life and guided me in my personal journey of life and planting occurred when I attended the annual seed exchange that is put on by the Food and Seed Sovereignty Alliance, which usually occurs in northern New Mexico. Participating in the Seed Exchange gathering was such an inspirational and fulfilling experience.

The gathering began with a blessing and panel discussion, and then two presentations. One presenter, Dr. Pang, gave a very informative presentation on the health concerns related to trans-genetic engineering of crops and the open-air cultivation of genetically modified (GMO) crops. It was the first time I was really presented information on how GMOs are actually produced. I was able to see the science and technology behind the production and engineering of these crops and began to understand what GMO actually is and means. I was able to learn more about the health concerns related to the production of these crops and technology and was inspired to continue learning and educating myself about the issue. Learning all this information about GMOs and being a part of the Food and Seed Sovereignty gathering with so many farmers and families, made the presentation that much more intense and it felt like it was that much more important for us to care for our seeds, for our health and the health of our world and future generations.

After the presentations we ate a lunch that was prepared with locally grown food--it was so good! Tamales, salad, beans, chile--all the foods that I love and cherish, and it just reminded me of how beautiful seeds are and how important they are for our existence.

After lunch there was a dance and blessing of the seeds. It is an honor to live in New Mexico, and it is such an honor to be a part of a community that cares for the seeds and cares for the earth. During the blessing of the seeds, farmers lined up and presented their seeds in a basket to the group. The name of the farmer was announced, what seeds they brought, and where they came from. Then they mixed the seeds in a big basket in the middle of a circle where all the farmers sat. It was so beautiful, and reminded me that love and care is such an integral part of the planting process. To look around and feel such a strong circle, such a strong circle of care and compassion that nurtures the seeds and stewards the earth, was a blessing and I am eternally grateful for that. It is inspiring to think of how many people plant every year and how many crops have survived and continue to be grown season after season.



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# Plants

## Pretest Questions

1. What do roots do for plants?
2. Explain Photosynthesis.
3. Explain Pollination.
4. How do seeds spread?
5. What is chlorophyll?

All life forms depend on plants directly or indirectly for food. All plants fit into two categories, flowering and non-flowering. Plants grow in almost every climate.

## Seeds

Seeds contain all the parts and the food the plant will need to germinate or grow. When conditions are right the seed will absorb water and the root begins to grow downward into the soil. The root will anchor the plant and absorb water and nutrients. Then the shoot will grow upwards and produce the stem and true leaves. When the true leaves open the plant begins to make its own food. Until then, the plant relies on the seed for its food.

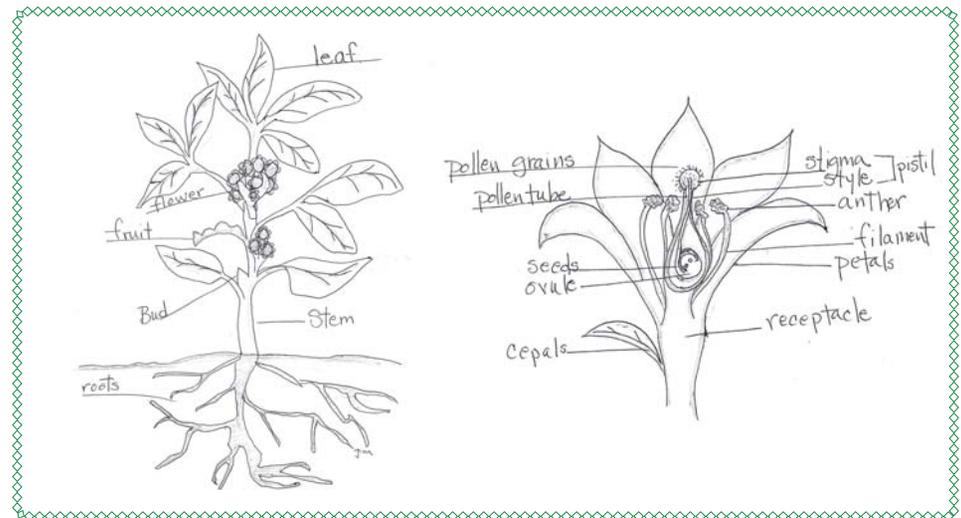
## Photosynthesis

The process the plant uses to produce its own food is called photosynthesis. The plant uses the green pigment in the leaves called chlorophyll to convert and store the energy from the sunlight into starch. The starch is then converted into glucose which the plant uses for food. As the plant matures the stems will strengthen and grow upwards and the root system will thicken. ➤

# Plants

## Pollination

Pollination happens when pollen from one flower reaches another flower of the same kind. Some pollen can be moved by the wind, but most rely on bees or insects. These small insects are attracted to the flowers by their color, their scent and the nectar of the flowers. Pollen from the anthers will stick to the feeding insect's head or back, when the insect moves to another flower the stamen receives the pollen. The pollen moves through the stigma and down the style to fertilize the ovule an embryo forms and eventually a seed will begin to take root grow into a plant and bare fruit. Some of the fruit will fall to the ground and the seed inside will wait to grow. Some seeds called drifters or spinners, will scatter with the help of a breeze or sticky seeds will catch a ride with animals as they feed or walk past. This process of seed to seed is called the life cycle of a plant. 🌱



# Plants

## Lesson 1

### Photosynthesis

*Discussion: Plants respond to their environment. Water and light will effect the growth of a plant. The process of photosynthesis needs water, air and light in order to produce food for the plant.*

1. Have individual or small groups of participants line plastic cups with paper towels and add water. Place some of the seeds between the cup and the paper towel.
2. Have some other individual or small groups of participants fill plastic cups with potting soil and some water. Plant seeds in cups next to the plastic so they can be seen.
3. Have participants place their cups in different areas of the meeting place or outside. Offer places like closets, shade and sunlit areas for their cups.
4. Participants can check their cups every three days and draw what their seeds and plants look like. Remember to add water to the cups.
5. Have participants do one drawing of the plant in their journals, along with written observations. Another drawing can be done on an index card and placed on a chart. Having the drawings side by side will make the observations easy and fun.

### Vocabulary

Photosynthesis, environment

### Evaluation

Participants will have completed drawings and observations.

### Extension

Participants can put their plant in a different area and note the changes in the plant.

### Objective

Participants will observe the effect of sunlight on a plant.

### Materials

- clear plastic cups
- paper towels
- potting soil
- seeds
- small index shaped cards

### Skills

- history research
- clay construction
- design and planning of container

## Lesson 2

### Parts of a Flower

*Discussion: The trainer will explain the process of pollination. The trainer will use a diagram of the flower parts and their function.*

1. Participants will observe a flower, then draw and color a picture of it.
2. Participants will then take apart their flowers, draw and label each part.

### Vocabulary

Pollination, sepals, petals, pistil and stamens

### Evaluation

Participants will be able to label parts of the flower with an understanding of their function.

### Extension

Student will draw and label other parts of the flower and their function.

## Lesson 3

### Cold and Warm Crops

*Discussion points: Cold crops, such as lettuce, kale, chard, onions and some herbs can be planted in the fall and harvested through out the winter months. The crop may need to be cover with mulch, fabric, plastic or glass to hold sufficient heat for the plants to grow. They may need occasional watering.*

*Warm crops, such as peas can be planted in the spring and summer crops, such as tomatoes and chili grow from May – October.*

### Evaluation:

Participants will decide on their planting cycle using information discussed.

### Objective

Participants will identify and label parts of a flower.

### Materials

- journals and art materials
- flowers, large and different if possible
- poster or diagram of a flower with labeled parts

### Skills

- labeling
- drawing still life
- diagram parts in contrast to whole

### Objective

Participants will discuss the rhythm of using warm and/or cold weather plants in the garden.

### Materials

- journals, research tools
- expert gardeners as a resource

### Skills

- discussion and research
- decision making skills

# The Three Sisters and New Mexico Chile

BY PILAR TRUJILLO

In New Mexico we have a unique growing season because of our weather. We need plants that can handle our desert climate. For example, during the summer months when most vegetables are grown, we will have very hot days but the evenings will drop in temperature sometimes by as much as 30 degrees to be very cool. We need plants that can grow in these conditions.

Before the Spanish came to New Mexico in the 1500's, the Pueblo people were already growing crops. Among other things, they grew what is known as the "Three Sisters": maíz (corn), frijoles (beans), and calabaza (squash). These are examples of hardy, native crops that still grow well in our region.

The Three Sisters are planted together in a mound of soil. This is known as companion planting, because each plant helps the other plant to grow. The maíz is planted first in the mound of soil. When the maíz is about 6 inches high, the calabaza and frijoles are planted around it. The maíz stalks provide a structure for the frijoles plants to climb up. The frijoles provide nitrogen to the soil for the maíz and calabaza to use. The calabaza leaves provide shade, which prevents weeds from growing, and also helps keep the moisture in the soil.

There are other plants that are commonly seen in milpas (fields) in northern New Mexico, including chile. Chile was brought north from Mexico with Spanish settlers but quickly became a staple crop.

My family grows a native strain of chile in Chimayó. There are several different types of native chile, but most of them look alike: the chiles are generally smaller, curled up or in different shapes, and they may not be as "meaty" as the chile you find in the store. Some people don't know that green chile and red chile come from the same plant. In fact, green chile turns red if you leave it on the plant. When it's time to pick the green chile, my brother always tells me, "Make sure it's maciso before you pick it!" What he means is that the green chile must be firm to the touch or else it is not ready to be picked. The red chile can be picked as soon as it is dark red in color. We make rstras (strings of chile) out of the red chile and hang them so the chile dries. Then we grind the dried chile pods and make sauce. This is also where we get the seeds- from the dried red chile pods. If you eat chile with corn, beans and squash then you are eating a balanced and delicious meal- something that our ancestors figured out for us. 🌱

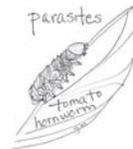
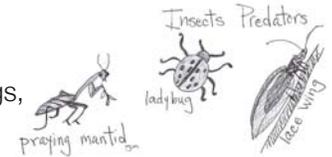


# Insects

Many insects in your garden are beneficial to plants and to you.

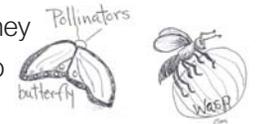
There are four kinds of insects:

➤ Predators eat other insects. They are ladybugs, praying mantids, dragon flies and spiders.

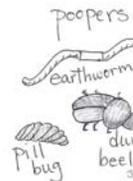


➤ Parasites are wasps that lays eggs on tomato hornworms. When the eggs hatch they eat the hornworm alive.

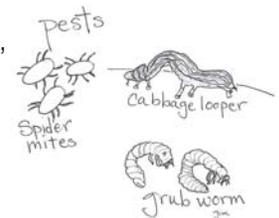
➤ Pollinators are butterflies, bees and wasps. They look for nectar in the flowers and in the process help pollinate plants.



➤ Poopers are earthworms, pill bugs and dung beetles. They work as decomposers. They eat, digest and excrete dead plant material. The material is full of nutrients that return to the soil.



➤ Other insects include: Corn earthworms, aphids, spider mites, squash borer larva, cucumber beetle, cabbage looper, grub worm and mealy bugs.



# Insects

## Lesson 1

*Discussion: Where do insects live? Insects live in habitats where they can find food water and shelter. Where could we find insects for observation?*

1. Decide how many nets you will need (individual or one per small group.). Send the instructions home with the participants, it is a perfect family project.
2. Give the participants about twenty minutes to collect insects. Ask them to brush their nets through the branches of bushes, weeds, trees, plants. Participants can then flip the net over the rim to trap the insects.
3. Gently flip the insects from the net into the container. Here they can be observed and then released.
4. Participants may use their journals to record observations, along with the habitat they were taken from.
5. Student will use the reference books to find the names of the insects.

### Vocabulary

Collection, habitat, observation, classification

### Evaluation

Participants will have entries in their journals that include observations, habitat and the names of insects.

### Extension

Participants will classify insect as beneficial or harmful in a garden setting.

### Directions for an insect collection net:

1. Bend a metal hanger onto a circular shape.
2. Attach the wire to a 3'- long handle with duct tape.
3. Fold a square piece of thin material, (a yard in length) in half, cut a half circle and sew around the edges. Sew the straight edge to the wire to create a net.

### Objective

Participants will observe insects collected from different habitats in the garden or the community environment.

### Materials

- insect collecting net, instructions (instructions follow the lesson plan)
- net materials
- a covered jar or box with air holes
- insect reference books
- magnifying lenses
- journals

### Skills

- collection
- recording
- using reference books

# An Ancient Friendship

BY COLIN BAUGH

The essence of a garden is to create a fresh, life giving force that takes shape in multiple ways that ultimately nurture us, the people that rely on the garden. And yet, a garden created, maintained, and cherished only through our human hands would inevitably fail in multiple ways. The simple and beautiful fact of creating a garden is not only reconnecting with our mother, the earth, but also remembering the dearest friend plants and we all share...Insects!

Our insect friends have a guiding force that sustains itself with direct and indirect help from us, the gardeners. It is within the garden that food and shelter are provided to the smallest insect up to the largest of wildlife. Seeing the clear dependence we both have within the garden is formed, a very special and powerful offering is presented.

This truth encapsulates that a garden is for all forms of life, and that the garden itself is life. This offering is best expressed in a traditional prayer spoken throughout New Mexico:

*"Para Yo, Para Vos, y Para Los Animalitos de Dios."  
"For Myself, For You, and for all of God's Little Animals."*

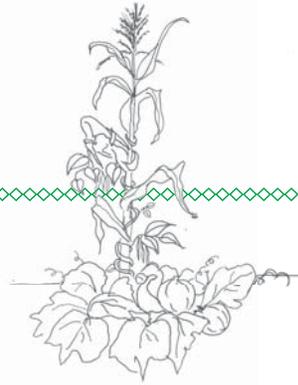
This prayer is spoken and held when planting three seeds at every spot throughout the garden. Knowing that these three seeds are food going into the land that all have the right to enjoy, you allow for that little squash bug or caterpillar to eat. Planting three seeds is the balance within the garden when inevitably one or all get hungry. This philosophy of planting for all becomes an integral part in understanding the randomness of life, and for all living creatures.

When we carry this prayer, we are in turn allowing ourselves to grow. Allowing for a spider to share the vine of your tomato plant or letting baby toads practice their stroke while you are watering is the absolute expression of a gardener. Becoming a gardener is evolving into a tool that encourages growth and stewardship of the land. In so, if we only focused on the plants and neglected the insects that pollinate and protect, we would never see a harvest. If we only see insects as pests, and animals as a nuisance, we are only ushering in a sterile, unlivable earth. We must allow and maintain space for all these amazing creatures that aid us in infinite ways that we can barely grasp.

Once this prayer is uttered throughout the planting of a large garden or even farm, it takes on a repetition that is very powerful. For one does not forget something that is acted out thousands' of times. And in turn, the power of dialogue is formed. This is a dialogue that you can hear in a cricket's song announcing a freeze, or in the pattern of which corn stalk the crows like to pick at. All of these subtle actions were at first just random acts of life, but with more careful and conscious understating, they unveil a complex order that can benefit all. If we all listen to and respect this ancient friendship between humans and all of God's little animals, then our gardens will truly thrive. 🌱

*"Para Yo, Para Vos, y  
Para Los Animalitos de Dios."  
"For Myself, For You, and  
for all of God's Little Animals."*

# Harvest



## Pretest Questions

1. What are three aspects of a harvest?
2. How might a harvest be successful?
3. What are two ways produce may be used?
4. How may your harvest be used in a community?

Harvesting is the taking of the fruits and vegetables from the plants so they can be eaten or processed into other goods. Celebrations and Festivals are held around the world during harvest times. Many areas have growers markets where farmers and gardeners gather to sell their fresh produce. There is much work around the farms and gardens to harvest the produce when it is ripe and at its full flavor. Some produce may be harvested and ripen on their way to stores or processing.

Plans for who will help harvest, when the harvest will be ready, and what will be done with the harvest are important components in your initial marketing plan. Depending on the amount of crops harvested, plans for storage, preparation and marketing of the produce must be handled in a timely manner. Again, planning ahead is a good idea.

## Community Garden Harvest

Harvest time at a community garden is a time of enriching the academic content areas beyond the textbook, the meeting space and the garden. It is a time when participants move from the garden and into the kitchen to celebrate the preparation and consumption of the food they have worked so hard to harvest. If there is not enough produce harvested local farms and markets may be willing to supplement your lessons. ➤

# Harvest

Working together with families and the community to gather the harvest can turn work into a celebration. Traditions and culture are easily shared when people get together for a common goal. Projects such as plays, family recipes, art displays, storytellers, dinners and games interweave themselves into experiences to remember. Learning together to recognize ripe produce is an adventure of the senses, taste, sight, smell and touch all work together to provide a wonderful experience.

## Nutrition

Having fresh produce at hand is an excellent time to study and build an appreciation of how nutritious foods help us to grow and maintain good health. Learning how to choose a variety of nutritious foods helps develop the habit of a lifelong healthy diet.

Preparing foods from the harvest is a wonderful time to involve parents and the community. The sharing of cultural, environmental and sustainable aspects of our lives are all part of the preparation and the enjoyment of food. It is a time of building community.

Planning for the use of extra food that has been harvested may include, sending it home with participants, donating it to food kitchens, preparing it for extended storage or taking it to sell at farmer's markets. Besides food, vegetables are used in many other products like soaps. They are used as decorations and for creating art.

## Markets

Local Farmers' markets are an excellent place to buy and sell local produce. It is a place to meet with friends and celebrate a time of plenty. Foods available at a local market are usually unprocessed or minimally processed and therefore are full of nutrients. Good food choices are easy to make at a farmers' market.

## Community Supported Agriculture

Some local farms will offer the community shares in the produce they grow. The shares are paid for in advance, and the community member receives weekly produce as it becomes available from the farm. This gives farmers the capitol to pay for seeds, labor and the equipment they will need to get ready for the next growing season. Eating locally grown food helps to support small farmers and the environment.

## Saving Seeds

Remember to save seeds from some of your produce to share and trade with other gardeners, farmers and seed banks. 🌱

# Harvest

## Lesson 1

### Where does Food Come from?

*Definitions: Unprocessed foods are fresh or raw food. Minimally processed foods are foods that are changed in order to make them more available for use. Boiling an egg is an example of a minimally processed food. Highly processed foods are foods that under go more of a change to make it available and convenient to the consumer. Often nutrients are lost and chemicals are added.*

*Discussion: What is processed food? What processed foods do you eat? What are your favorite foods? All food comes from plants or animals.*

1. Review what processed foods are.
2. List favorite foods.
3. Have participants, individually or in small groups, list plant or animal products that go into the preparation of the types of foods listed. Categorize them on the chart.
4. List foods that are eaten with little preparation.
5. Have participants copy the large chart information into their journals.

### Vocabulary

Categorize, sort, processed foods

### Evaluation

Participants will understand that food comes from plants and/or animals.

### Extension

Participants will categorize a food by plant and animal product on their own.



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### Objective

Participants will categorize food to its source - plant or animal.

### Materials

- pictures of food
- poster board divided into "plant or animal" columns
- journals and art supplies

### Skills

- using a chart for categorizing

## Lesson 2

### Food Groups

*Discussion: Do you think you are eating a healthy diet? Include cultural and economic traditions of food. Introduce the Food Pyramid along with the kinds and amounts of foods needed for healthy eating.*

1. Student will copy or design their own chart for the food they eat during three to five days.
2. After three to five days participants will take the foods from their daily list and write them under the appropriate food pyramid columns.
3. Participants will compare their lists of food to the pyramid. They may do the comparing with the whole group, in small groups or between themselves and the trainer. The trainer should remain culturally and economically sensitive to her group when reviewing daily food intake.
4. Discussion will continue on the benefits of making healthy food choices.

### Vocabulary

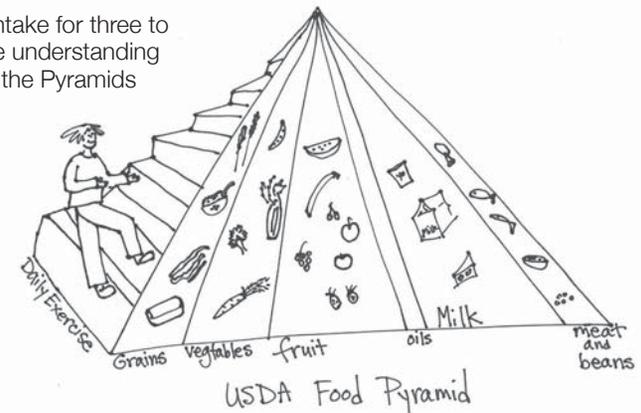
Charting, sequencing, compare and contrast, food pyramid

### Evaluation

Participants will chart their food intake for three to five days and be able to show the understanding of comparing their food intake to the Pyramids suggested intake.

### Extension

Participants will create a list of healthy foods available to them that more closely fit the daily intake shown on the Pyramid.



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# Harvest

## Lesson 3

### Collaborative Cooking

The group will review the recipe. The trainer or team leader will demonstrate the correct use of the kitchen tools and terms used for the recipe. Participants will prepare the food.

### Vocabulary

Recipe, units of measurement,

### Evaluation

Participants will have followed the recipe and have a completed dish. Participants should have time to eat together and talk about the process of preparing and enjoying the food.

### Extension

Participants can add their personal touch to certain aspects of the presentation of the food. This will encourage an ownership of the process.



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### Objective

Participants will work in multi-level age groups to collaboratively prepare food harvested from the garden.

### Materials

- recipe
- available produce from the garden
- supplemental ingredients needed for the recipe
- kitchen and eating utensils
- journals and art materials

### Skills

- following directions

## Lesson 4

### Livestock

*Discussion: The cycle of raising animals and their benefits. Such as chickens eating bugs and unwanted plants, as well as fertilizing garden beds. Animals as a source of food – eggs and meat. Small animals such as chickens as opposed to cows, goats or sheep. What to feed the animals, where and how to house them*  
*Daily responsibilities of caring for animals*

### Evaluation

The group will use the discussion points to make a decision on whether to include animals as part of their garden.

## Lesson 5

### Community Celebration

Trainers or leaders will help participants set goals for the celebration. Steps towards meeting their goals will progress.

### Evaluation

Participants will set goals and plan the steps necessary in meeting their goal.

### Extension

The group and the community will meet in celebration of the Harvest.



### Objective

Participants will discuss the possibility of including livestock or small animals as part of their farm.

### Materials

- various research articles and tools
- a field trip to a farm

### Objective

1: Participants will work with families in the community to have a local food celebration.  
2: Participants will build awareness and appreciation of healthful foods and build a sense of community.

### Materials

- foods available: from the garden, donated foods, family prepared foods
- cooking and eating utensils

### Skills

- goal setting
- organizing
- creating awareness

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# Chile and Gleanings from the Past: Harvest Stories from My Family

BY ANGELINA LOPEZ-BRODY

Still under my bed covers, I heard my mom moving around in the kitchen banging pots and pans. But it's early and it's Saturday, I thought. Awake, I fumbled out of bed and the smell of eggs, potatoes, and green chile lured me toward the kitchen. "Breakfast burritos!" my mom cheerily declared, as I wiped the sleepies out of my eyes. I remembered that we were going to peel our annual bushel of green chile this morning. So that's why she was making noise so early.

After breakfast, we drove down to the Fruit Basket on 4th Street. We paid for a bushel of medium chile as well as the roasting.. As the gas flame licked and charred the skin of the chile, the delicious smell of fall filled my nostrils. After the chiles were blackened, the roaster opened the cylindrical drill and the chiles cascaded into a clear trash bag to steam themselves.

We drove home and got our peeling station set up - bowls for chiles, buckets for peels, wet towels, and glasses of water. My mom reminded me of the cardinal rule of peeling: "Don't rub your eyes or you'll regret it." My mom opened the hot bag of chiles and got a pile going in the center of the table. We set in. My mom talked about how her best friend and fellow teacher Ms. Abeyta was doing and which one of her new 1st graders misbehaved the most. I talked about my new classes and how my friends were doing. We took turns peeling and bagging. By lunch time we had a freezer full of green chile, assuring us that we could feed our chile fix until the next harvest.

Chile peeling has been the most consistent harvest activity in my life. I am the first generation of my family to grow up in a big city, though the last full-time farmers were my great-grandparents. I am getting closer to the ebb and flow of the seasons as I embark on my journey to become a farmer. At the same time, I am blessed with memories - my own and those of my family - about the harvesting cycle of life. Here are a sampling from my family's past.

My great-grandparents, Juan and Donelia Valencia, had a homestead outside of Marvel, Colorado, just on the other side of the New Mexico border from Farmington. Together they raised goats and dry farmed pinto beans and wheat. I only saw my great-grandmother a few times as a young girl, but my father told me many stories about his summer-long visits as a boy. My father, his brothers and their cousins herded goats, irrigated fields from the acequia, cut firewood, and otherwise helped on the farm.

In the fall after my father went back to Durango to go school, Juan and Donelia would continue preparing for winter by harvesting their crops and drying, canning, and root-cellarling vegetables. After the pinto beans dried out completely on the stalk, the bean pods were picked and threshed. Before he had a thresher, my great-grandfather would winnow hundreds of pounds of beans by hand. After one breaks open the pods, one winnows beans by pouring them into the wind – the dry pods blow away and the heavy beans fall into a collector. Think about how much time it must have taken to pick all the pods and winnow them all! Wow! ➤

Another fall activity was butchering animals. Almost the entire animal was used – tongue, eyes, and brains were delicacies, providing valuable fat and nutrients. My great-grandmother hated to make menudo from the tripe, or intestines, of the goat. The tripe would have to be cut open, cleaned of partially digested food, boiled in several changes of water, and then added to broth, chile, and cooked hominy. Between their goats, their dry field crops, the vegetable garden, and plenty of hard work, they made a decent living. Though they were never money-rich, John and Donelia, their 11 children, and their many grandchildren had their needs met.

Their daughter, Consuela, married my step-grandfather Octavio "Dave" Florez in the 1960s. Though Grandpa Dave worked as a miner, they always had a huge garden. When we drove up to Aztec, NM to visit them, we could expect hard work and good food. Dave's shovels and hoes were smooth and shiny from all of the hours they spent in his working hands. I can remember running through their huge field of corn, which was at least twice as tall as I was, to find ripe ears of sweet corn for my grandma to cook for lunch. I loved to help Grandma Connie collect warm eggs from her hen house and watch her make jelly and syrup from their grape vines and from wild choke cherries. At the end of our visits, she sent my father and stepmother home with quarts and quarts of peaches and pears canned in syrup. At home, I would plead to open one of these treasured jars for dessert.

My father, with the soil in his blood, always kept a big garden too. One hot August morning when I was eight, we launched a serious assault on the beet harvest. My brother and I visited my dad every other weekend, Friday afternoon to Sunday afternoon and this particular offensive lasted nearly the entire time we stayed. First we picked the beets, many of which were the size of baseballs. Then we proceeded to clean them, boil them, peel them, and then either freeze or sweet pickle them. The beets dyed our hands maroon for the next few days.

That same summer, my dad took us camping and we found a big bramble of wild raspberries. My brother and dad set to work picking them. I had just learned that bears eat a lot during the warmer seasons to store fat for their winter hibernation. I was seriously worried that we were hurting the bears' food supply. I couldn't understand why we would want to undercut the bears and possibly attract their wrath. Trying to reason with them, I exclaimed "How would YOU like it if the bears came and ate all of YOUR food?!" I, of course, enjoyed the fresh raspberry jam we made for breakfast.

Years after that trip, I am learning more than ever about harvesting and farming as Farm Manager at La Placita Gardens in the South Valley of Albuquerque. Sometimes I am frustrated that my family's knowledge of farming the earth didn't pass very well to me, but I have faith that with time and patience, I will know enough to make sure that I can pass along the joy and satisfaction of harvest to the next generation of my community and family. 🌱

# Winter

## Preparing the Garden for winter

Once the crops have been gathered, there are many things to do to prepare the garden for winter. Much of the preparation gets the soil ready for a new plant life cycle. Here is a list of chores you can start in mid-September through October:

- Clean up garden debris. Leaves and branches can harbor insects and disease spores.
- Continue to weed. Pull the weeds before they have a chance to seed. Do not add the weeds to the compost pile, they may contain seeds.
- Take a soil test, you may be able to amend the soil in the fall.
- Till the soil in the fall if erosion is not a problem. Add compost or manure to improve soil structure.
- Plant a cover crop to protect soil from erosion during the winter. In the spring, tilling it into the soil will provide organic matter to improve the soil structure. A cover crop also shades the soil and prevents weeds from germinating.
- If you decide to mulch choose one that is consistent in color and texture. One that will resist compaction, resist wind and water erosion, has a slow rate of decomposition and reduces weed growth. You might decide to try small amounts until you find the one that suits you garden.
- Plant trees, shrubs, evergreens and bulbs in early fall to allow root growth before winter. 🌱

# Winter

## Lesson 1

### End of Season Soil Test

1. Divide group into small groups or individuals.
2. Fill each jar 2/3 full of water.
3. Add soil samples until the jar is almost full.
4. Put the lid on the jar.
5. Label each jar with the location the soil was collected.
6. Shake the jars vigorously. Let the soil settle.
7. Observe how the soil begins to separate.
8. Place jars where they will not be moved and can be observed for 24 hours.
9. The soil will separate into levels of clay, silt and sand.

### Vocabulary

Sequential directions, samples, labeling and percentages.

### Evaluation

Participants will label soil levels and make comparisons to levels taken at the beginning of the growing season. Information will have been documented in journals.

### Extension

Participants will discuss the changes in soil content and the ways to improve nutrient levels.

### Objective

Participants will classify the soil in the garden area and determine its quality in comparison to the beginning of the growing season. Participants will compare their soil samples after they settle into levels.

### Materials

Fr each small group:

- one glass quart jar with lid
- markers
- soil samples from different areas of the garden - taken from about 2 inches below the surface, after the garden has been cleaned
- water

### Skills

- following sequential directions
- collecting samples
- labeling

# Winter

## Lesson 2

### End of Season Crop Cover/Mulch

*Discussion: Cover crops such as oats, black-eyed peas and hairy vetch are planted to amend the soil, they are planted so they cover the entire area of the garden. When the plants reach the desired growth level they are tilled under to help add nutrition and build the soil for the next crop that will be harvested.*

*xv  
Mulch is small pieces of organic material, such as hay or tree bark. The mulch is spread over the garden area to help retain moisture and/or keep the soil from eroding. Mulch may be used between crop planting or along with the crops to be harvested.*

Participants will use various resources to build a bank of information on which to make a decision on the cover crop or mulch which best suits their garden needs.

### Resources

County extension educators, agricultural mentors, field trips to farms or garden centers

### Evaluation

Student will decide on a cover crop or mulch which best meets the garden's needs. The decision will be researched based.

### Extension

Participants will document the condition of the garden at weekly intervals and they will begin to plan for the next growing season.

### Objective

Participants will research and experiment with different cover crops and/or mulch as ground cover for the end of a growing cycle.

### Materials

- research materials
- seeds for a variety of cover crops
- mulch samples

### Skills

- research skills to use in decision making

# Livestock

BY SPIRAL BLANTON

While the majority of people in the U.S. get their meat, eggs, cheese, milk, etc. from the stores these days, home-scale livestock production is by no means a thing of the past. In my South Valley neighborhood, I often see animals such as chickens, goats, pigs, cattle, guinea hens, horses, geese, and sheep. I keep a few chickens for the delicious eggs they lay. Another potential benefit of having chickens is that you can use them to clear, till, and fertilize garden beds. This is done by rotating them through the garden in mobile coops called "chicken tractors".

Many modern farms in New Mexico specialize in producing just a few or even one main product, farms of the past were often much more diversified. This was especially true when more people were "subsistence farmers"--this means that they were directly providing for many of their basic needs through working with the land. Such necessities include food, water, shelter, and clothing. Caring for various types of domesticated animals has historically been a crucial part of creating a self-sufficient and vibrant life on the farm.

Just a few generations back, it was common for most families in small New Mexico villages to keep a milk cow. Instead of going to the store to buy milk and the things you get from it (like butter, cream, and cheese,) people would milk their cows and process it at home. The types of cows they kept were not always those specifically bred for milk production. The so called "dairy breeds" such as Holsteins (the now familiar white ones with black splotches all over) were quite expensive. Family milk cows were generally the same types that were bred for meat. Like other livestock, these animals were raised on pasture. Today, many animals raised in closer confinement are primarily fed grains.

Providing meat is, of course, an important reason for keeping animals. While the thought of raising and slaughtering your own animals might make a lot of people squeamish today, the reality is that any meat you eat comes from a living creature and someone was involved in raising and eventually ending the animal's life before you ate it. Just like with growing your own vegetables and fruits, providing your own meat involves a lot of attention. And unlike a tomato plant or an apple tree, you can't ignore the needs of your animals for a few days without causing them harm. They need good food, clean water, clean bedding, and sometimes medical care. Whether raising for food or keeping them as pets, people often develop very positive relationships with animals. Youth in particular can often connect easily with animals they are caring for. Growing up on a farm has usually meant sharing responsibility of tending to animals as well as other needs of the farm.

While chickens, and some other fowl are particularly suited for the smaller spaces typically available in an urban environment, the manures produced by larger livestock can be a real bonus if you are also gardening where you live. Along with other organic materials from plants, manures from animals that mostly eat plants decompose into a material that basically looks and smells like dark, rich soil. The farm I work with collects large quantities of horse and other manures from neighbors who have animals, but who do not utilize their "waste". We combine the manures to make the compost we need to enrich, improve the texture, and sometimes the drainage or water holding capacity of the soils in our gardens. As you can see, the livelihood of people is connected with animals in a lot of different ways! 🌱

# Preparing for Winter

BY SPIRAL BLANTON

A special aspect of being engaged in farming or gardening is that you become especially aware of the rhythms and changes of the different times of the year. Our main growing season begins in May and winds down towards the end of October. I feel a growing sense of contraction moving into wintertime. The days grow shorter and colder and the plants die back into the earth. The abundance of warmer days begins to seem like a distant memory. While winter can outwardly seem like a very still and slow time, it is a most dynamic and important season for the gardener and the earth. The long nights provide space to contemplate and plan the adventure of working with the land another year. It is a wonderful time to evaluate what how things went this season and to nurture ideas about what we might do next year.

Physical work outdoors does not stop in winter. We build long compost windrows to provide for next year's crops. Plant materials are recycled from in and around the gardens—weeds, leaves from trees, and dead plants from hot weather crops like tomatoes, chilies, etc. We layer these with locally collected animal manures (horse, cow, chicken, goat) to create a rich soil amendment. Some hardy crops are "over wintered." These include greens (lettuce, kale, chard, etc.), some herbs, and members of the onion family (garlic, onions, leeks). In our dry climate, such crops may need occasional water during cold weather and will do better with the climate moderating "helpers" such as mulches and special covers made of fabric, plastic, or glass. By February, we are busy amending and tilling the soil in preparation for the upcoming season. This is one way we're lucky—our friends in wetter climates usually have to wait much longer until the soil is dry enough to work!

While there is outdoor work to be done, winter is a great time to do all those things those indoor activities we didn't have time for when it was warmer. Some activities I am engaged in during this time include compiling harvest records from the past season, cleaning and organizing seeds we have saved from the past season, doing a seed inventory, working with our volunteer board and core group to come up with next year's goals and budget, and planning next year's garden. We grow a diversity of crops (40+) and several varieties of many. We do this on three different plots and strive for good crop rotation while working with various growing conditions. The farmers put together a seed order (we strive to support small companies that work to maintain genetic diversity), developing a planting schedule and acquiring new tools and other supplies we need

By the late winter days of February, we are starting some crops in our greenhouse. Seeds and little plants are watered and cared for until the conditions are right to plant them outside. We gradually plant more and more "early" crops outdoors, such as peas, greens, and root crops during the increasingly warmer days. The crops—and weeds—start growing more abundantly. As we become fully engaged in tending to the rampant life springing into being outside, the comparatively sparse days of winter become yet another memory...

I have shared my experience on a particular farm through the winter in Albuquerque. If I were on a farm with more animals needing attention or a place engaged in more "season extension" (such as hoop houses and solar heated greenhouses), my activities during this time would be different. What I hope to convey is that regardless of the type of work being done in the "off" season, the work done during the colder time of the year is crucial to our farming success throughout the whole year. 🌱

# Food Systems



## History

Before agricultural history began, people traveled in order to hunt and gather the wild food that was available. It is estimated that around 1000 B.C. a group of people from Mexico migrated north and settled in the Mogollan Highlands which would become Southwestern, New Mexico. They introduced three domesticated plants of maize, beans and squash.

Over the next 1,500 years people settled into areas that would support the growing of crops. They became reliant on agriculture and no longer needed to gather a wild food supply. Permanent homes were built and planned communities such as Chaco Canyon with irrigation systems, and roadways were established. The development of irrigation systems and seed selection, gave way to culturally specific crops and products.

## Food Processing and food storage

It was not until the early 1800s that canning food was invented. Canning is the process where food is heated and sealed in airtight containers. With this invention food was now able to travel without rotting or contamination.

Pasteurization was the process of regulating heating times and temperatures to kill bacteria and microbes. Pasteurization brought with it an understanding of germs and their effect on food. During this time health standards for cleanliness were put into place. ➤

# Food Systems



By the end of the 1800s refrigeration was being used to preserve food. Ice was used to keep food cool so that it lasted longer. Refrigerated train cars could now carry fruit, vegetables and meat for long distances with out spoilage.

In the 1900s ships were outfitted with freezers to transport food and by 1930 refrigerators and freezers were being made for homes. Soon after, refrigerated trucks were carrying foods to markets.

Food markets offered full service in the 1900s. A customer would hand the grocery clerk a shopping list and the clerk would get the products for the customer, often weighing and packaging products from large bins and crates. Groceries were then delivered to the customer's home.

Sixteen years later self serve grocery stores opened. These stores allowed customers to walk through the aisles of food before getting to the cash register. By seeing the food, the consumer purchased more products.

Our super markets and super centers of today offer one stop shopping with a variety of fruits, vegetables, meat, bakery and non food products from around the world. Many of the products in the store are highly processed, and though convenient, offer limited nutrition.

With the ease of transportation, fresh, processed and frozen foods could now be transported, exported and imported. Farmers having been the source of knowledge about agriculture changed. With research and technology scientists have modified seeds to yield more produce. This often takes more out of the soil and farmers have to add nutrients or fertilizers. Some of the fertilizers are synthetic in nature and will stay in the soil and our food, eventually making its way to the ground water.

Many people oppose the genetic modification of seeds, saying that they are not safe for human consumption. They are concerned that genetically modified crops contaminate heritage seeds, affecting crop production and food safety.

Research continues with genetically modified foods. They have been introduced into the food cycle with promises of added food and health benefit, such as vaccines and a longer shelf life. These foods have not had long term testing on human health. 🍅

## Lesson 1

### Global Shopping

1. The participants and trainer will discuss how food is processed for extended shelf time and travel. The discussion can include food systems to explain the steps taken in order for some food to reach the supermarket shelves.
2. As reinforcement participants will take a field trip to the local supermarket. Divide participants into small groups and assign different areas of the market, such as frozen foods, canned goods and produce. Participants can check labels for the country of origin.
3. Participants will check the label, list the products and the countries of origin in their journals. Back at the meeting place they can find the country on the map, list the food and trace the possible path the product traveled to get to the supermarket shelf.

### Evaluation

Participants will gain awareness of the origin of certain food products and how they travel in a food system.

### Extension

Participants will note expiration date of shelf life on the products they have tracked.



### Objective

Participants will find countries of origin on food labels at the supermarket in order to trace the travel path of foods.

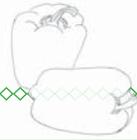
### Materials

- world map
- journals and art materials

### Skills

- using a world map
- reading for information
- research on travel routes

# Food Systems



## Lesson 2

### Local Food Systems

A local food system provides the community with foods that are seasonal and often tied to cultural and historical aspects of local consumers.

The farmer will grow quality food that local shoppers are interested in buying. When the crops are grown and harvested they are taken to meet the needs of different markets. Farmers may sell the crops from their farm directly to consumers or they may transport them to local markets or to schools. The marketing and promotion of crops may depend on the availability of local businesses and networks willing to work together.

There are many organizations working to develop programs to help consumers identify and increase access to local products available in the marketplace.

When an individual, group or organization works to connect farmers with consumers they are helping to build a local food system.

There are campaigns across the United States encouraging consumers to buy local food because it is better for the environment since the food takes less fossil fuels to transport; the food is fresher and more nutritious for the consumer; and it provides local jobs.

### Lesson

Participants will research crops and time lines, then present information.

### Evaluation

Participants will compare local food systems to global food systems.

### Objective

Participants will research which foods are grown locally and the amount of time and transportation needed for the food to reach their tables.

### Materials

- journals
- research materials (internet, library, guest speakers)

# Crosswalk

Our Crosswalk chart lists the lesson plans in the manual and how they may be used as lessons in the Classroom Content Areas. 🌱

Lessons	Reading	Math	Science	Social Studies	Language Arts	Arts	Life Skills	Process Skills
Planning Lessons 1-7	x	x	x	x	x	x	x	x
Mapping the Garden Lesson 1-2	x		x	x		x	x	x
Establish Garden Boundries	x	x	x		x		x	x
Garden Tools	x	x	x	x				
Supplies for garden structures	x	x	x	x	x			x
Cover Crop	x	x	x	x				x
Soil Quality	x	x	x	x				x
Soil Comparision	x	x	x	x				x
Water Cycle	x		x	x	x	x	x	x
Transpiration	x		x					x
Tap and Fiberous Roots	x	x	x			x		x
Planting in Different Soils	x		x		x			
Saving Seeds	x	x	x	x		x	x	x
Photosynthesis	x	x	x			x		x
Pollination	x		x			x		x
Insect Identification	x	x	x			x		
Food Groups	x	x	x	x			x	x
Collaborative Cooking	x	x	x	x	x	x	x	x
Community Celebration	x	x	x	x	x	x	x	x
Garden Clean Up	x		x				x	
Soil Test	x	x	x				x	x
Cover Crop/Mulch	x	x	x					x
Global Shopping	x	x	x	x	x	x	x	x

## Resources

### **Bernalillo County Cooperation Extension Service**

4-H Agent  
1510 Manual N.E.  
(505) 243-1545, email: bernalil@nmsu.edu/4-H

### **Collective Heritage Institute**

826 Camino de Monte Rey #A6  
Santa Fe, NM 87505  
(505) 986-0366, email: www.bioneers.org

### **The Permaculture Institute**

(505)455-0270

### **USDA New Mexico State Farm Service Agency**

6200 Jefferson N.E., Rm. 211  
Albuquerque, NM 87107  
(505) 761-4900, email: www.usda.gov

## Web Resources

### **Edible Schoolyard**

www.edibleschoolyard.org

### **Agroecology in Action**

www.agroeco.org/

### **Exploring Sustainability in Agriculture: An Online Sustainable Agriculture Instructional Resource, Center for Agroecology and Sustainable Food Systems (CASFS)**

zyx.ucsc.edu/casfs/instruction/esa/index.html

### **Life Lab Science Program**

www.lifelab.org

### **National Campaign for Sustainable Agriculture**

www.sustainableagriculture.net/index.htm

### **New Mexico Acequia Association "Sembrando Semillas"**

www.lasasequias.org/programs/sembrandosemillas

### **Sustainable ABQ**

www.sustainableabq.com/news\_events.htm

### **New Mexico Ag in the Classroom**

www.nmaitc.org

## Books & Videos

### **How to Grow More Vegetables and Fruits (and Fruits, Nuts, Berries, Grains, and Other Crops) Than You Ever Thought Possible on Less Land Than You Can Imagine**

by John Jevons  
*"A great introductory gardening book, with an emphasis on caring for soil health and the 'biointensive' production method."*

### **The Backyard Homestead Mini-Farm & Garden Log Book**

by John Jevons, J. Mogador Griffin, & Robin Leler

### **Four Season Harvest**

by Elliott Coleman

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