

# **Adventures in Agriculture:**

**Guidelines & Activities for  
On-Farm Education Programs  
held at Mill Valley Farm  
in Stratham, New Hampshire**

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Christine H. Fowler  
North Twin Education Programs  
HC 74, Box 425, Norcross, Millinocket, ME 04462  
(603) 498-3506 ktaadn\_me@hotmail.com

**Distribution Information:**

Extensive time and energy went into developing and documenting our agriculture education programs. We hope that these guidelines will help others to create and refine similar on-farm education programs. **Please use and share contents liberally with fellow farmers and educators!** But, in keeping with the generosity of those who freely shared their activities and insights with us, please do not copy or distribute any part of the contents of this document for profit.

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Phone (802) 656-0471 Fax (802) 656-4656 <http://www.uvm.edu/~nesare/>*

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# 1. INTRODUCTION:

Teaching children some of the practices and philosophy of organic farming, and getting them intimately acquainted with one farm in particular, can connect children and their families with the sources of their food, give them basic building blocks for more sustainable food consumption patterns, and increase their inherent support of local organic farmers. On-farm education programs can increase farm income directly (through tuition fees) and indirectly (through increased public awareness of the farm and its produce). It will be marvelous if some of these on-farm agricultural education experiences become seeds to inspire future generations of sustainable farmers.

Each activity contained in this collection could easily suit a summer day camp, an extra-curricular program during the school year, a series of school field trips, or a single day spent at the farm. We recommend that they be modified and arranged to meet the needs of the particular on-farm educators using them. They were used successfully over the course of three years in summer programs at Mill Valley Farm, in Stratham NH, a formerly agricultural community whose population is burgeoning as a result of rapid suburban sprawl.

These activities are intended for use in educational programs on a working organic vegetable farm, as part of that farm's overall operations. While they could be modified for use in school or community gardens or even in a regular classroom setting, our hope is that they will inspire others to create and sustain on-farm education programs which will in turn support local, small-scale, diversified and sustainable farms.

# 2. GUIDELINES & REFLECTIONS:

During the summers of 2000, 2001, and 2002, we ran several sessions of **Adventures in Agriculture**, summer programs at Mill Valley Farm in Stratham, NH. Most were two-week sessions for children entering grades 1-5, but we also held a two-week session for students entering grades 4-7, a one-week session for students entering grades 4-6, and a one-week session for students entering grades K-2. Examples of our brochures are in Section 15. In Section 13 we have identified some of the specific ways we arranged the activities.

At its inception, Adventures in Agriculture was a new program in the NH Seacoast. As such, we gained many valuable insights over the course of three years' preparation and execution. Some of these conclusions are outlined below. We hope that they will inform others who are beginning, refining, or otherwise involved in similar agriculture education programs:

# 3. PLANNING ON-FARM EDUCATION PROGRAMS:

## **Non-farming Parents Value Agricultural Experiences for Their Children.**

The greater New Hampshire Seacoast region has few farm families, but in this increasingly suburban landscape, parents do value the opportunity for their children to spend time on a farm. In fact, they will pay good money for it. Initially we billed our programs as "science education on a farm", but quickly learned that parents were more drawn by the farm than the science.

We were fortunate to have a high percentage of children return for programs in subsequent years, demonstrating that both parents and children valued the experience. Below is attendance data.



### Adventures in Agriculture Attendance by Year:

2000	22 children	-----	
	(10 returned in 2001 = 45 % retention rate)		
2001	71 children	(14 % returning, 86 % new)	222 % increase in size
	(18 returned in 2002 = 25 % retention rate)		
2002	67 children	(26 % returning, 74 % new)	6 % decrease in size
	-----		

We did not have any programs in 2003, but predict we'd have had similarly high retention rates and comparable program size. Anecdotal evidence indicated remarkably high enthusiasm and strong commitment to the programs on the part of most families.

### **The Broader Community Supports On-Farm Education Programs.**

We were fortunate to have assistance from a variety of sources, including corporate donations of snacks, local business donations of snacks and scholarship funds, and media exposure.

**Snacks:** Several corporations donated food for our snacks, including Stonyfield Farm, Newman's Own Organics and Pavich Family Farms. We also received food donations from local businesses such as Blue Moon Market and Portsmouth Health Food.

**Scholarships:** A local restaurant that uses organic and local ingredients (The Flatbread Company) underwrote the full tuition for one child, while a local natural foods store (Blue Moon Market), created a vehicle for their customers to contribute to a scholarship fund, which helped support two children.

**Media Exposure:** Local and regional mass media are as eager to feature children and farms as those publications in the agriculture community. We benefited from the publicity generated by a pre-program article in the New Hampshire section of the Boston Globe, mid-summer features in three of our local newspapers and a brief highlight on our local NPR station. Several articles in agriculture-related publications such as the NOFA-NH Newsletter and New England Farm Journal helped us make connections with other potential and current farm-educators.

### **Marketing Takes Time and Money:**

During our initial planning and budgeting, we failed to include any funds for marketing. This was a serious oversight. Further, we realized that marketing is more than just producing a brochure. Much of our marketing work involved making the programs known in the community, through newspaper articles, posters, letters to schools and CSA members. Some examples of our marketing efforts can be seen in Section 14.

### **Market Early!**

Many parents plan their children's summers at least as far in advance as a farmer plans her crops. We were successful when initial brochures and information went to parents by the end of January. A newspaper feature that comes out in March or April would likely generate additional early registrations, while ones that come out during the summer programs are actually doing some advance marketing for the next year.

### **Word of Mouth Marketing is Best:**

As parents and their children spread the word about our programs, we find that the new participants are very likely to have expectations in line with what we offer. The direct experiences of the students themselves gives a realistic picture of our programs. In our second and third years we sent multiple copies of the brochure to former participants to encourage this word of mouth communication among friends and neighbors. (Examples in Section 15.)



Over the three years of programs, 130 children attended at least one session. They learned about the programs in various ways, but mostly by word-of-mouth. (Over two-thirds of the children first found out about Adventures in Agriculture via a personal connection with a friend, schoolmate, the program director, or the farm.) Below are our rough statistics:

#### How Families Learned About Adventures in Agriculture:

- 35% (45) - from a friend or schoolmate (many from one school in particular)
- 26% (34) - a personal or school connection with the director
- 9% (12) - an existing connection with the farm (stand, CSA, farmer)
- 11% (14) - newspaper articles or other publicity
- 9% (12) - via a YMCA Camp collaboration
- 10% (13) - other or unknown

#### **Cultivate School Connections:**

Because the program director was an after-school enrichment teacher and early childhood educator, she had extensive contacts in the local schools. Our programs also attracted families whose children attended the local Waldorf school. Each year we mailed letters and brochures to public school parent-teacher organizations and to private schools throughout the region.

#### **CSA Membership Connection:**

Mill Valley had an active Community Supported Agriculture component. Several of the dedicated program participants were already CSA members, and the programs built on their established relationship to the farm. Other families became dedicated CSA members after their children participated in the programs. While we cannot predict the percentage of participants who will become CSA members or percentage of CSA members whose children will participate in programs, it is clear that having education programs and a CSA on a farm has a positive effect on both CSA membership and program participation.

#### **Tailor the Program to Your Farm:**

We recommend constructing a program that reflects what actually goes on at the given farm. Specific, relevant, and real activities are especially effective for teaching children about one farm in particular. While it does make sense to introduce concepts or techniques that differ from those used on your farm, the majority of time should be spent on activities that directly relate to your farm. (To know something is to care for it.)

#### **Pay Yourself and Your Staff Worthwhile Wages:**

One of our priorities was to make this economically feasible for program staff. Both agriculture and education are notoriously low-paying fields, especially when one considers the substantial effort and the social benefit of the work done. This is a gross injustice in our society, and we sought not to perpetuate this system of sub-standard pay for important work.

The experienced teachers and farmers who staffed our programs were paid independent contractor wages of \$18/hour for their time, which included an additional 1.5 hours of planning & preparation each day. This rate of pay remained constant over the three years. (Because they were short-term employees paid as independent contractors, their pay was self-employment income, subject to self-employment taxes. This arrangement was simpler for us to manage, and it was agreeable for the program staff, given that their net pay was still substantially higher than market rates for seasonal agricultural workers or camp counselors.

To allow us to pay these wages, we charged as much tuition as we felt the market would bear, increasing slightly each year. These are the actual prices we charged (program length 4.5 hrs/day)

2000, two-week programs - \$225 (\$190 members)

\$35 discount for CSA members

2001, two-week programs - \$245 (\$220 members)



longer day two-week program - \$330 (\$305 members)  
\$25 CSA member discounts  
2002, two-week programs - \$260 (\$235 members)  
one-week programs - \$160 (\$135 members)  
\$25 CSA member discounts

We also kept other (non-wage) overhead costs as low as possible, by soliciting donations, buying snacks at low prices in bulk, and finding inexpensive or free sources of materials. Besides labor, our most substantial costs were snack foods and portable toilet rental.

The farm was paid basic rent for the duration of the program. The first year this was \$75/week, then \$150/wk in 2001 and \$200/wk in 2002. The farmer felt this was adequate compensation, given the minimal effort and inconvenience to him generated by the program, and given that the farm already was covered with substantial liability insurance because of the CSA (Community Supported Agriculture) and PYO (Pick Your Own) operations. Other farm-related expenses were dealt with on an individual basis. For example, Adventures in Agriculture paid separately for the portable toilet rental, for some tools and equipment such as thermometers and hoses, and also contributed to the annual upkeep of the animals.

Each year, the director earned a lower wage rate for her time and effort than either the staff or the farmer. The planned budget was for her to earn \$900 for each week of Adventures in Agriculture (\$5400 for six weeks), with any program profit designated as her compensation for the substantial time she spent doing marketing, keeping records, preparing, purchasing supplies, etc. In reality, there was no additional profit.

For example, in 2002, the director earned a total of \$5200 for six weeks of programs plus the related preparation in the months beforehand. Despite being less money than planned, it still seemed worth the effort. If the director wanted to earn more money relative to her investment of time, the finances could be tweaked slightly or practices could be modified. For example, in 2002, one session technically had too few registrants to be self-supporting, but rather than cancel a session and suffer the negative publicity, the director decided to assume a personal financial loss in the short term, for the long-term success of the program.

#### **Think Simple and Low-Cost Inputs:**

Because we wanted the program to be self-sustaining and affordable, we did our best to use low-cost or free materials whenever possible. Section 10 has a comprehensive list of some of the supplies and materials we gathered. "Make do or do without", was a guiding philosophy.

#### **Increased Farm Visibility Resulting from Programs:**

Having programs at the farm made it more known in the community. Thanks to newspaper articles, parent networks and increased traffic to the farm, there was a broader sector of the local population aware of the farm's produce. This expanded market created increased sales, particularly at the farm stand when programs were in session.

#### **On-Farm Education Programs are Profitable:**

The bottom line is that education programs are a profitable "crop". If a farmer is interested in hosting programs and there are qualified educators to conduct those programs, on-farm education can be successful for all concerned.



## **4. RUNNING ON-FARM EDUCATION PROGRAMS:**

### **Animals are Important:**

While Mill Valley is primarily a vegetable crop farm, it is clear that both children and their parents are attracted to the experience of caring for farm animals. Caring for the chicks, adult hens, roosters, a rabbit, an aged female sheep, an aged female goat, and yearling buck goats were essential elements of our program. While it would be possible to have successful programs without animals as part of the equation, it might be harder to attract and retain interested students.

### **Multi-age Programs Work Well:**

In our culture, generally educators place children in limited-age peer groups, but we feel that it is important for children to learn and work with children across a broad age range. Besides supporting our educational philosophy, there are practical benefits to multi-age programs on a farm. First, it helps families to send several of their children to one session. Also, we see fewer of the negative social behaviors that can erupt when working with a large group of children at a single developmental stage. Older students mentor younger ones and the naivete of the younger children somehow lets the older ones liberate themselves to join games and activities that they might otherwise scorn. And besides, the world is multi-age! For some activities it makes sense to work in smaller groups with a narrow age range, but most of our farm day was spent in successful multi-age groups.

### **Junior Counselors are an Asset:**

Each year we had at least one participant who was too old for a given program but who acted as a volunteer junior counselor. (Most of these had younger siblings who were paying participants in the program.) This arrangement provided useful extra assistance for the adult staff, but more importantly, it was valuable for the children. The younger participants had older children as helpers, mentors, and even heroes, and the junior counselors thrived on the responsibility and respect garnered by their position. This expansion of our multi-age model worked well.

### **Shorter Days Worked for Us:**

We enjoyed a day that started earlier and ended before the heat of the day was at its most oppressive. (8:30-1:00). We tried a longer day (9:30-3:30) one year, and found it difficult to sustain a positive attitude ourselves, much less to inspire the children, who got hot and tired and were difficult to motivate. With no provision for safe water play at the farm, we all got hot, tired and cranky. Therefore, we preferred to end our programs earlier in the day and send the children home to cool off. Also, because it was not a simple childcare solution, we seemed to have very few disinterested campers and families. Many parents did ask us to consider a longer day, and while we realized this time constraint decreased our applicant pool, we felt it served our needs better to end at 1:00. Other on-farm educators should consider these points and decide what works best for them.

### **Be Flexible:**

Each summer, session, week and morning began with a plan. Inevitably those plans were modified. Perhaps the weather affected our activities, maybe the crops weren't at the anticipated stage, the group dynamic may have impacted our potential. Working with children is like working with a farm - you can't insist on sticking with a pre-arranged plan. It helped us to have a series of back-up activities on hand, ready to implement when we had to make an unexpected change.

### **Integrating Education Programs into the Farm Takes Patience:**

It's a balancing act to have education programs at a working farm, and we struck a different balance in each summer, depending on the context. One year, there was only one full-time farmer, and so the children worked exclusively with program staff. Another year, the education programs were very integrated into the whole-farm mechanism, which had the benefit of enriching their



experience substantially. That year, the farm crew was extremely experienced and independent and the program was fairly small, and the farm crew welcomed the children's participation. Often one adult worked with one or two children at a time, teaching them a task and sharing wisdom. Another year, there were more children in the programs and the crew was less-experienced, so the education programs usually operated separately from the farm crew. We did relevant projects, but the children worked primarily with program staffers.

Two things of note: First, children loved to work with "real farmers." While there were farmers among the program staff, it was more exciting to help Farmer Dave harvest new potatoes than to dig potatoes with the rest of us. Second, on-farm education programs add to the complexity of farming and may be sources of tension for the farmers. There are many more people at the farm, the children can be a distraction, and it requires planning to keep both the programs and the food production running smoothly. This new dimension to the already challenging task of farming should be carefully considered by all concerned.

### **Children Crave Authentic Work:**

In our experience, children were maximally engaged in work which was clearly connected to the functioning of the farm. In our post-Adventures in Agriculture survey, doing chores was a favorite task, as well as collecting insect pests, harvesting, and weeding. The "academic" activities (ones more likely done in a classroom setting) were seldom cited as favorites.

We also noticed that when children were permitted to work on projects that they had generated themselves, they carried them out with great vigor and commitment. For example, one year a group of students were inspired to use rakes and manual push-mowers to simultaneously mow a weedy border and feed the greens to the sheep and goats. They organized themselves into teams of mowers, rakers and feeders, with "supervisors" of each group. When one of the mowers broke, they worked together to figure out how to fix it (with guidance from adult staff). This was a project they begged to work on at least twice daily, which suggests it was an appealing and satisfying activity. Another year, children asked if they could collect weeds from the flower beds to feed to the chickens, goats and sheep, and accomplished this in a similarly independent and well-organized fashion.

Furthermore, offering children meaningful work does more than actively engage them in the short term. Their work matters, and their contributions count. They have ownership in the given task and are similarly invested in the success of the farm itself. By successfully completing "real work" that is also done by adults, children gain valuable self-assurance and confidence in their abilities.

### **Children Crave Self-Directed Creative Expression:**

When the children were creating a work of art, they were almost universally engaged in the process. Some of our successful creative projects included constructing garden spirits, making creatures of vegetables, weaving on mini-looms they had built themselves, pounding flowers and leaves, and creating natural sculptures as inspired by artist Andy Goldsworthy's books. The children seemed to relish the opportunity to invent their own creation and carry it through to completion.

### **Children are Capable:**

We believe that children are resourceful, intelligent problem-solvers. Given this, we deliberately organized our programs to give them opportunities to try new things and work out ways to succeed at a new skill.

Without abdicating our responsibility to keep the children safe, we trusted the children to use many tools appropriately. They hammered with all sizes of nails, measured materials for us to cut, helped adults use power drills to screw together the chicken tractors, helped tear a rotting ramp off the barn, dug holes, used manual push mowers, cultivated crops with hoes and a wheel hoe,



harvested produce with clippers, set up irrigation equipment and more. We felt it was important for them to be given real responsibility in a supervised situation, as part of development of skills. However, we acknowledge that it is not worth sacrificing the integrity or future of the farm in order to give the children authentic experiences. In other words, we weren't completely cavalier about what work the children were allowed to do. (They weren't risking an entire crop by using hoes to cultivate tender seedlings and they weren't risking their lives by operating heavy machinery!) Yet, we did structure our programs to allow them to experience as many farm-related challenges as possible.

### **Consider Safety:**

Mill Valley is a small farm, with relatively low mechanization. Also, it is certified organic, so there are few dangerous inputs. However, there are still plenty of ways that children and adults can get hurt on the farm. (Bt is a controlled pesticide. Heavy equipment is used to plow, cultivate, and harvest. Animals can be unpredictable. Poison ivy abounds. Wild and domestic bees and wasps can sting. Rhubarb leaves are toxic. Hoes are sharp. Hammers are heavy. The list goes on.)

As already noted, we strongly believe that children can be given responsibility to use tools and materials properly. However, we think children need to know the expectations entailed in this privilege. Before each program, we sent out safety guidelines, outlining some of the things to consider when spending time on a working farm. We asked parents and children to discuss these together and each sign the form stating they had done so. On the first day of each session we reviewed those safety expectations with the children. (These forms are in Section 15.)

We kept a well-stocked first aid kit, including special soaps to minimize allergic reaction to poison ivy. For each session, at least one staff person was trained in CPR and First Aid, and we had plans in place in the event of an emergency. The farm's significant liability insurance (because of its PYO and CSA operations) covered the programs as well. Additional insurance should be considered. In three years of programs we had only one wasp stinging incident and one case of poison ivy besides the usual minor scrapes, cuts or splinters that come with children.

### **On-Farm Education Programs are FUN!**

Our programs succeeded because the program staff were interested in sharing the farm with children. Agriculture Education Programs are a lot of work to plan, prepare and conduct, but that work is very satisfying. We were privileged to see children working and playing together outdoors and making the whole farm a special part of their own world, something that isn't usually possible for a classroom educator or a farmer. We all felt blessed.



## **5. AGRICULTURE EDUCATION ACTIVITIES:**

By spending time working, thinking, learning and playing on an organic farm, students are introduced and exposed to various aspects of organic agriculture and farm life. The subject matter is conveyed through lessons, activities, games, songs, and even the daily snack.

Given the interconnectedness of the various aspects of organic farming, the activities herein should be sequenced to suit the needs of the individual teachers, students or farmers. Some possible sequences are given in Section 13. They can be easily arranged and rearranged for the particular conditions of a given day, season, farm, group of children and leader.

There are countless opportunities for teaching and learning on an organic farm. Some things are explicitly taught, others are merely introduced, still others are only implied. Skills, concepts, values are all elements of on-farm education. The topics and subject matter varies widely, from math and science to philosophy and art. Really, there's a lot that goes on at a farm... These innumerable opportunities may be arranged in countless ways. The activities described in this guide are sequenced as outlined below:

### **Agriculture Education on an Organic Vegetable Farm**

- I. Food Crop Production
  - A. Soil and Compost
  - B. Plant Biology & Plant Propagation
  - C. Harvesting and Preparing for Market
- II. Biodiversity in Organic Farm Environment
  - A. Insects & more
  - B. Animals
  - C. Plants
- III. Weather (Meteorology)
- IV. Food Preparation (Cooking with Whole Foods)
- V. Other Activities



# I. Food Crop Production

*Running programs on a small-scale certified organic vegetable crop farm offers innumerable opportunities for learning and meaningful activity. Children can participate in most aspects of production, especially given that there are no residual chemical pesticides or fertilizers and there is relatively little mechanization using heavy equipment. For many children, farm-education programs are the first time they have planted and nurtured a seed, pulled a fresh carrot from the ground, or sampled a strange vegetable like kohlrabi. All aspects of production are instructive.*

## IA. Soil and Compost

*Healthy and fertile soil is one of the most essential components of healthy and productive organic farms. For some farmers, it is the most important thing they do. Therefore, it is useful for children to explore different kinds of soil, to see what it's made of, what it is like, what affects it, how it affects plant growth, what improves it, why it's important, and so on. But more than anything, we study soil so that we can get our hands dirty!*

### Introduce Soil:

- Generate prior knowledge.
- Brainstorm a list of questions students have about soil.
- Write on chart paper and post in workspace.
- Include the following: What is soil? What kinds of soil are there? How do you tell different soils apart? Why is soil important for plants? What lives in soil?
- Basic Definition: Soil is the top layer of the earth's surface, made of rock, minerals and organic matter.
  - Rock- *small and large sizes (stones)*
  - Minerals - *important for nutrition (of plants and of people too!).*  
*e.g.: calcium, iron, zinc, potassium, sodium (salt).*
  - Organic matter - *anything that is (or once was) living.*  
*e.g.: roots, leaves, seeds, fruit, vegetables, seaweed, bones, skin, manure.*

### Share Books About Soil:

- Display catalog of college course listings on soils. (There's a lot to know about soil!)
- Read children's book about soil or dirt

### Different Kinds of Soil:

- Display samples of different soils. (Use labeled collection of soils from forestry dept.)
- Collect samples of soil for experiments. (Use large buckets.)
- Each student can choose own sample from anywhere on the gathering expedition.
- Collect specific types of soil from these places on the farm
  - Clay-type (mostly clay, with some sand particles) - *from the pond, dig under the silt to get clay*
  - Loam-type (about equal parts clay and sand particles) - *from field classified as "loam"*
  - Sandy-type (mostly sand, with some clay particles) - *gravel from the lane - possibly river sand*
  - Peat-type (mostly decaying organic matter) - *from the woods (watch out for poison ivy!)*
  - Compost (high in organic matter!) - *from compost piles*
- Collect samples of soil from specific fields that were tested recently.
- Dig down to root depth (6-8") and put sample in a clean bucket
- If testing pH, etc: Tools may need to be cleaned w/ peroxide after each collection.

### Sand vs. Clay Particles:

- Offer children a metaphor for visualizing the differences between different mineral particles.
- Using 2 same-sized clear jars, fill one with pennies (representing clay) and the other with marbles (as sand).  
(clay particles are small, flat and disk-shaped, like pennies)
- Spaces btwn. pennies much smaller than spaces btwn. marbles. (Spaces are called "pore spaces")
- Jar with pennies has more particles than jar with marbles.



- Another Analogy: if a sand particle is the size of a basketball, a silt particle would be the size of a golf ball, and a clay particle the size of a dot made by chalk.

### **Make Soil Shakes:**

- Make Soil Shakes in small jars or test tubes by putting in a small amount of soil, adding water, covering, shaking vigorously to combine sample of soil with water. (Narrow diameter test tubes make it easier to distinguish layers.)
- Add Alum to make the layers separate more clearly.
- Each student makes own soil shake with own soil sample.
- Observe samples as shake, and immediately afterward
- Compare to unshaken soil sample.
- Set aside for a while until layers settle. (Could take up to 1-2 hrs or longer to really settle out. Less time if narrow-diameter container such as test tube.)
- After soil samples settle into layers, note appearance and proportional size of each different layer).
- Should settle out largest particle to smallest, with organic matter floating on top.
- Compare to pre-made illustrations of soil shakes showing approximate percentages of soil components (clay, silt, sand, organic matter) for each soil type.
- Compare individual samples with group samples - what sort of layers does each personal soil shake have? - What might be the primary component of each type of soil?

### **Test Chemical Composition of Soil:**

- With an adult, use soil test kit to determine chemical makeup of soil samples.
- Nutrient levels (especially NPK ideally 1:2:1 to 4:6:3)
- pH of soil (6.0-6.8)
- Adults should do the chemical measuring.
- Wear safety glasses and gloves.
- Compare to university extension soil analysis results for specific fields.

### **Paint with Soil:**

- Smear soils on paper.
- Use brush and watery soil.
- Paint on selves. (Crazy activity! Could suggest this toward end of session if seems appropriate.)
- Compare properties of different types of soil paint.
- Which soils work best for painting?
- What do they feel like when painted/smear on?
- What happens when the paintings dry?

### **Sculpt with Soil:**

- Refer to Andy Goldsworthy books
- Use various soils to sculpt or work with hands
- Compare properties of different types of soils when sculpting.  
Sticky? Gritty? Slippery? Holds together? Falls apart?
- Which soils work best for sculpting?
- What happens when the wet sculptures dry down?

### **Sift Soil:**

- Use different sizes of screens and filters to compare characteristics of different types of soil.
- Separate soil samples into their components by sifting with progressively finer screens.
- Compare various samples.
- Need dry soil for this work (dry in greenhouse ahead of time if necessary.)

### **Strain Soil:**

- Use coffee filter method (as with drip coffee)
- Compare characteristics of the "coffee" brewed with different types of soil.



- Observe color, clarity vs. cloudiness, density of the brew.
- Which soils give the cleanest water?
- Which soils have particles that get through the filters?
- Use filters or screens of different sizes or types (paper, gold mesh, etc.)

### **Compare Physical Characteristics of Different Soils:**

- Observe differences and similarities among various samples of soil.
- Describe appearance, weight, smell, texture.
- Compare properties when wet, dry, in solution, etc.

### **Work with Wet Soil:**

- Compact very wet soil and then let it dry out. (Dry it in the greenhouse.)
- How do different soil types respond?
- What happens when you work the soil and it's too dry?
- Introduce the test of squeezing soil (from Gardening with Kids p. 46)
- What's the problem with soil compaction?
- What are might be effects of tractors, horse cultivation, etc.?

### **Make Soil Ribbons:**

- Classify soil texture by feel.
- Use soil samples gathered on farm to determine possible soil composition.
- See "Soil Texture By Feel" sheet in Section V: Other Activities.

### **Plant Seeds into Soil Samples:**

- Plant radish seeds (or other quick-germinating seed) in the sample soils (class samples and individual samples).
- Use good-sized containers.
- Bottom water thoroughly.
- Label each soil type and place in ideal germination conditions (moist, warm, etc.)
- Observe germination of seed and growth of seedling over time.
- Does soil type affect germination?
- Does soil type affect growth?

### **Observe Water Absorption Rates of Soil in Ground:**

- Open both ends of aluminum can (e.g. coffee can, soup can, etc.) Cover sharp edges with duct tape.
- Press one end of can into the ground, about 1 inch below surface of soil.
- Pour given amount of water (e.g. 1 cup, 1 yogurt container full, etc.) into can.
- Time how long it takes for the water to be absorbed by the soil.
- Check soil in another area.
- Which soils absorb water more quickly? more slowly?
- What influences speed of absorption? (Possible causes: presence/absence of plant matter, type of plant matter, soil type, current state of saturation...)

### **Simulate Water Flow (Percolation) in Different Soil Types:**

- Demonstrate how water particles flow through different soil types.
- Use children standing in a group to represent soil particles.
- Other children are water molecules, trying to flow through the soil (safely!).
- Soil particles are spaced differently depending on soil type.
  - Sand - lots of space between (can't reach other soil particles with outstretched arms)
  - Loam - less space than sand (can't reach other soil particles with elbows sticking out)
  - Clay - very little air space between particles (just barely not touching)
- Water trying to get through soil in very little time.
- Discuss what happens (which soils easiest to move through, why?)
- What are implications for water absorption, water retention, etc.?



### Mix Special Seed-Starting Soils:

- Make seed starting mix, soil block mix, transplanting mix. (Use farm recipes.)
- Mix by hand (with hands or small tools in bucket or wheelbarrow) or with cement mixer. (careful supervision!)
- Discuss properties and purpose of various components (perlite, peat moss, compost, soil, etc.)
- Discuss reasons why different uses require different proportions of ingredients.
- Compare properties of different mixes when dry, when wet, etc.
- Point out need for wearing dust masks and adding some moisture while mixing.
- Could heat soil to eliminate some pathogens and sterilize weed seeds. Discuss. Do demo of heating technique.
- Students could create own recipes for soil mix.

### Introduce Concept of Compost:

- Look at samples of compost with hand lenses (5 min, 10 min) What's there?
- Do a definition map - visually define compost with children
- Diagram compost heap
- What is Compost? What isn't compost?
- Generate prior knowledge - what do students know already?

### Compost Poetry:

- Share this poem by Walt Whitman:

Behold this compost! behold it well!

Perhaps every mite has once formed part of a sick person - yet behold!

The grass of spring covers the prairies...

The resurrection of wheat appears with pale visage out of its graves...

Out of its little hill faithfully rise the potato's dark green leaves,

Out of its hill rises the yellow maize-stalk, the lilacs bloom in the door yards,

The summer growth is innocent and disdainful above all those strata of sour dead.

Walt Whitman, *This Compost*

- Compose own poems about compost, individually or collectively
- Share poems orally, make a book of them, post them in farm stand or in CSA room

### Vermi-Composting:

- Introduce worm bin composting method.
- Sort through compost, looking for various sized red wigglers (worms), eggs, etc.
- Compare to earthworms found in outdoor compost or in field soil.
- Discuss pros and cons of vermicomposting versus other methods (wind rows, triple bins, etc.)

### Create Wormeries:

- In glass jars, create visible layers of various kinds of soil, nitrogen (grass, green leaves, food waste), carbon (brown leaves, hay, straw).
- While layering, include worms and other decomposers.
- Cover sides with black paper or cloth (worms avoid light).
- Keep moist, but not soaking (anaerobic decomposition! drowned worms! icky!)
- Keep in a cool, dark-ish spot.
- Occasionally uncover sides to monitor any decomposing, worm tunnels, etc.

### Compost Dramatization:

- Lead students through dramatization of process of composting with ready-made props
- Students can create drama and costumes/props themselves.

#### **Actors:**

Farmer(s) - *place ingredients in compost heap - layering*

also "turn" pile to intro oxygen (*turn by rotating/spinning the compost people in place*)

Compost enclosure sides - *3-sided to permit entrance and exit*

Compost people - *wear sthg to permit attachment and manipulation of compost ingreds.*



## Worms and Microbes/Nematodes/etc

*process the compost by transforming the layers of raw ingredi into "dirt" or composted soil*

*flip cards to other side (soil)*

*- 1 worm per compost person*

*- some cards complete breakdown, others incomplete breakdown*

*have layered cards*

*- on back of layered cards is dirt - transforming a little bit at a time*

*slowly lose ability to "process" the compost ingredi*

*- need intro of oxygen to boost heat and activity*

Thermometer - *temp rises and then falls - rises after oxygen intro*

*as temp rises, organisms get productive & multiply, when temp lowers they stop working.*

Oxygen - *can only enter pile when it's been turned by farmer(s)*

## Possible Costumes:

Affixable compost ingredients = *file cards - or 2-sided felt*

*depict various ingredients: hay/straw, food waste, grass, topsoil, animal manure*

*use velcro or masking tape to attach - or felt board, self-sticking*

Compost people (*velcro/felt covered sandwich board, burlap bag, garbage bag, raincoat, etc.*

*so that compost ingredients can be easily attached and manipulated)*

Thermometer (*red hat, or red stick that can rise and fall like mercury)*

Worms/nematodes (*special hats/masks)*

Bin sides (*paper bags as wood)*

Farmers (*straw hats/plaid shirts)*

Oxygen (*O2 superman badge)*

## Synopsis:

Farmers construct compost bin by positioning bin sides in 3-sided structure around compost people. Farmers add compost ingredients (onto compost people) in layers of hay, water, food, soil. Worms and microorganisms enter pile. Thermometer rises as temp goes up when worms-etc are actively changing waste to finished compost. Temp goes down and worms-etc slow down. Farmer turns compost. Oxygen is introduced, temp of the pile heats up, worms-etc process more materials. Repeat cycle until the waste has broken down into amazing compost.

## Build a Compost Heap:

- Students construct a compost heap to monitor. (It mostly decomposes in a 2 week summer program, but certainly will heat up to an impressive 140 degrees.)

- Construct a triple bin compost system in flat shaded area close to garden.

- Assemble raw ingredients:

**hay or straw** - 1 bale **Carbon**

**food waste** - as much as possible - 3 garbage cans **Nitrogen**

(kids could bring some of this on their first day, otherwise use crop excess)

**grass clippings** - 6 garbage bags **Nitrogen**

**topsoil** - 1 cubic yard

**animal manure** - 5 gallon bucket **Nitrogen** (*animal bedding is Carbon*)

(resource recommends horse, goat, chicken)

- Assemble tools

(spades/shovels, hose with sprayer, yardstick/rulers to *measure layers*, clipboard/chart paper to *record layers and track temperature*, magic wand and top hat, compost thermometer)

- Layer compost ingredients in one bin according to guidelines.

(Base: 4" layer hay, spray water lightly, add some manure, sprinkle thin layer soil. Add 4" hay, water, 2-4" grass, 2" soil. Repeat 2x before adding kitchen scraps to the h,w,f,s cycle. Continue layers until 3' high.

- Perform an incantation of the layers: "hay, water, food, soil..." (use magic wand and top hat, make it dramatic!)

- Record layers in farm's journal, making a "map" of the compost heap

- Turn compost every 3-5 days, completely from one bin to the next.

- Do this as soon as the temp drops from 120-150 deg "hot" temp.

- Record daily temperatures. Feel heat with hands! Steamy!

- Graph daily temperature over time. Compare to graph of daily outdoor temperatures (are they related?)



### Demonstration of Compost Turner:

- Farmer demonstrates large machine that turns (stirs) compost in wind rows.
- Compare to manually turning method, or bucket tractor turning.
- Consider pros/cons, costs/benefits (speed, efficiency, cost of machine, maintenance, fuel, etc.)

### Introduce Concept of Erosion:

When ground is bare, water and wind can remove, or **erode** the soil. Plant roots hold soil in place. Where plant cover is removed, runoff from rainfall can wash soil away, especially on slopes.

- Why are cover crops are very important for this?
- What sorts of cover crops can help? (The fibrous-rooted grasses, will hold soil better than sthg like buckwheat...)
- What happens to the land, air, water when the soil erodes?
- Why is the topsoil important?

### Erosion Simulation:

- Set up simulation/demonstration in advance.
- Create a series of "slopes" of soil as follows:
  - Seed crops into soil in plywood containers (about 1'x 3') with 3-4" sides (along 3' edge) and open or closed ends (with some drainage holes) or large plastic bins or something similar to hold soil and allow water to flow across top
    - a. nothing planted - bare soil
    - b. cover crop(s) of rye/vetch, &/or buckwheat, &/or oats, planted thickly
    - c. rows of plants planted parallel to contour
    - d. rows of plants planted perpendicular to contour
- Set up samples on a slant/pitch so each has its own "run-off" container to catch the run-off and visibly demonstrate different contents. (Use large buckets or tubs.)
- Water the slopes to simulate rain. (Kids do "raining" with a sprinkler, watering can or gentle spray hose sprayer.)
- Compare the run-off from each type of slope by examining the water in each bucket. (Color, contents...)
- Connect experiment to what happens to bare soil, cover crops, etc.
- Change pitch of slope to see if (and how) that affects the run-off.
- Change amount or force (flow) of water to see if (and how) that affects run-off.

## I.B. Plant Biology & Plant Propagation

*Because they are working in concert with natural processes, it is especially incumbent upon organic growers to understand various aspects of plant biology and how those are positively and negatively affected by various conditions. They need to know how plants produce seeds, which seeds to keep, how plants get their food, how plants can resist pests, how plants can compete with other plants, and more.*

### Introduce Six Main Plant Parts:

- Introduce six plant parts: bud/blossom/flower, fruit (contains seed), seed, leaf, stem, roots.
- Highlight different functions of each, rely on prior knowledge of kids.
- Dress someone up as plant. (Use costume parts that can be tied on, such as several strands of yarn for roots, paper towel tube for stem (xylem and phloem), green tissue paper for leaf, colored tissue paper for flower, plastic sphere for fruit, sparkly bow for seed (magic!).)
- Make an illustration on chart paper, showing various parts.

### Examine Different Crop Seeds:

- Identify different seeds - look for seeds in different seed-bearing "packages".
  - Have ex. of seed-packaging available for the identification process...)
- |          |       |        |             |           |                 |                 |          |
|----------|-------|--------|-------------|-----------|-----------------|-----------------|----------|
| lettuce  | beans | pepper | nasturtium  | blueberry | zucchini/squash | basil or dill   | broccoli |
| marigold | corn  | tomato | rye or oats | sunflower | peach or apple  | onion or garlic | carrot   |
- Include some non-local seed-packages like avocado, coconut, mango, kiwi.



- Include some nuts like walnuts, acorns, hazelnuts.
- Compare size, shape, color, texture, manner borne, etc.

### **Match Seeds with Their Source:**

- Divide the seed sources (fruits, nuts, etc) among each small group
- Match the seed source with the seeds that are out on display.
- Have butter knives available so they can cut into the fruit to check out seed.

### **Dissect "Seed Packages" Found in Fields:**

- Walk around the farm collecting seed packages, just crops or crops with weeds (overripe fruits such as tomatoes, cukes, zucchini, lettuce or broccoli gone to seed, grass seeds, weed seeds, sunflowers, other wildflowers or herbs...)
- Dissect seed packages to collect seeds.
- Dissect seeds to see undeveloped embryo, etc.

### **Make Seed Necklace:**

- Provide each child with a 2"x3" x 2 mil resealable plastic bag w/ pre-punched hole above the seal, cotton ball or folded paper towel, seed (bean seeds work well), water, string to make necklace.
- Need enough moisture in the bag to initiate seed growth without drowning the embryo.
- Wear necklaces next to body. Heat generated from bodies will encourage the seed to grow very quickly. - In a few days the seeds will sprout. Roots appear first.
- Identify various seed and plant parts.
- Compare timing of germination with same type of seeds planted at same time in soil or in some other medium.
- Discuss what causes the seed to grow.
- Discuss what it needs to continue growing.
- Transplant sprouts into container to take home.

### **Germinate Seeds in Baggies:**

- Many seeds will germinate with only water! (This may surprise some kids who think they need soil.)
- Conduct seed germination test - given number of seeds (10, 20, 25) spread out on a moist paper towel in a baggie.
- Suggest one purpose of germination test: to find out what percentage of seeds germinate.
- Who might find this information helpful?
- Note that germination rates typically decline over time - older seeds less viable.
- What else might affect germination rate (viability) of the seed? (excessive heat, cold, light, moisture, dessication...)
- Visually examine seeds at various stages (swelling; cracking; root, stem, leaves appearing)
- Dissect germinated seeds in various stages of growth (if use large seeds like bean, easy to see embryo developing.)
- Compare to dry (ungerminated) seeds. How changed?

### **Germinate Seeds in 6-paks of Potting Mix:**

- Kids can take these home at the end of the program.
- "Sure-thing" plants such as lettuce, basil, beans, sunflowers are preferable.
- Useful to plant things easily transplanted and likely to mature by season's end.
- Plant extra seeds for pulling up and dissecting (to examine root structure, embryo state, etc.)

### **Read Seed Book:**

- Share book or books on seed germination, plant development.
- Compare illustrations to actual samples of seeds we've germinated or plants we've grown.

### **Diagram Growth of Plant from Seed:**

- Share illustration of various stages of growth of seed's development into a plant.
- Compare to actual samples.
- Shake soil off small seedling, kids can draw or diagram it.
- Note roots, cotyledon (first leaves), true leaves, stem, embryo, etc.



## Plant seeds in soil mix:

- Teach methods used at farm.
  1. Cell containers/pyramid flats - Brassicas
  2. Mini-blocks - Lettuce and Basil
  3. 2" soil blocks - Cucurbits (cucumber, squash)
  4. Strip trays - Flowers, Herbs, Tomatoes, Peppers
  5. Six-pack containers - Transplanted Flowers, Tomatoes, Peppers

## Seed and Seedling Experiments:

- Vary conditions to study effect on germination and plant health.
- Students can record and document results in journals.
- Hypothesize possible results beforehand, compare to what actually happens.
- Include measurements and data gathering over time (e.g. percent germinating each day, plant height, etc.)
- Graph results over time of data gathering.
- Do a series of experiments for group to observe or let children create own conditions.
- Examples of extreme conditions:
  - Dry! Plant seeds into very dry (no water!) soil or dried-out soil blocks (made ahead)  
*(shouldn't germinate or grow.)*
  - Wet! Over-water seeds and seedlings. Leave drowning in a container of water with soil.  
*(should create anaerobic conditions - no air circulation, smelly, decomposing, etc.)*
  - Hot! Keep seeds or seedlings covered with humidity domes inside the greenhouse.  
*(should bake the seedlings, dessicating! No germination either.)*
  - Cold! Put seeds or seedlings into freezer or refrigerator.  
*(shouldn't germinate, may slow growth of seedlings or may kill seedlings.)*
  - Dark! Put seeds or seedlings into light-proof container or cover with shade cloth.  
*(some seeds will germinate, like beans, seedlings will grow to light, getting leggy and pale.)*
  - Soiless! Put seeds or seedlings into container w/o soil, but with all other requirements, esp. moisture.  
*(most seeds will germinate, seedlings may grow to a certain point then fail to thrive.)*
  - Overcrowded! Put way too many seeds or seedlings into a given space.  
*(most seeds will germinate, seedlings will not thrive - spindly, weak, leggy...)*
- "Control" Plant seeds in moist mix, taking proper care of them, providing adequate warmth, air, light, moisture, space, fertile soil, etc.
- Compare "controls" to experiments.
- Try to have children do at least one "control" of properly cared for seeds/seedlings so they can take them home.
- Monitor these experiments during subsequent days of camp.

## What Do Plants Need to Grow?

- Use data from experiments to explicitly teach what most crop plants need to grow well.  
water, air, warmth, light, soil, space, etc...
- Remember to emphasize importance of LIGHT for photosynthesis, producing sugars that are converted to energy.
- Refer to books, other resources for information and instruction methods.

## Test Various Planting Tools:

- Sample planting tools like hand seeder, block makers, soil tamping tools, bottom-watering trays, watering wand, row markers, plant spacing guides, push-planter, spinner/broadcaster.
- Evaluate ease and efficiency of each
- Rate favorites, have a "favorite planting tool contest"

## Direct-seed crops in the field (e.g. bush beans) :

- Teach methods used at farm.
- Plant seeds in small groups.
- Prepare field or bed (watch farmer rototilling with the tractor)
- Students can spread compost beforehand.
- Measure spacing between rows with rulers, hands or other tools.



- Mark multiple rows with string to keep rows straight and remind kids where beans have been planted (leave string installed until after seeds have been planted)
- Try the push-planter.
- Hand plant along row.
- Measure depth and spacing with popsicle stick spacers, hands, other tools.

### **Transplant Miniblocks into 2" Blocks (e.g. lettuce) :**

- Mix soil block mix, moisten with water to block-making consistency.
- All try using the two different 2" soil block-makers (3x4 and 1x4)
- Compare ease and efficiency of each.
- Separate the miniblocks.
- Introduce important task of "thinning out" the unhealthy or less vibrant specimens
- Choose strong, healthy plants for production.
- Transplant miniblock seedlings into 2" blocks
- Visually examine root structure.
- Why cover roots? Why press mini-block firmly into 2" block? Why moisten both before transplanting?

### **Transplant seedlings into the fields (e.g. lettuce, brassicas) :**

- Prepare bed.
- Mark edges of bed with string.
- Measure spacing with rulers, popsicle stick spacers, hands, or other spacing tool
- Mark spots for seedlings in each bed.
- Make holes with tool or with hand.
- Note various planting depths (often just to soil level of seedling with exceptions such as tomatoes)
- Separate seedlings, weed as needed.
- Visually examine roots (root bound?), separate slightly if necessary, explain why.
- Introduce subjective task of "thinning out" the unhealthy specimens
- Ensure survival of the fittest.
- Choose strong, healthy plants for production
- Place seedlings in holes.
- Cover seedlings firmly with soil.
- Water seedlings into soil with irrigation or other methods.

### **Planting Relay Game 1:**

- Assemble all of necessary supplies for planting and form relay teams to do the following:
  - Put soil in containers (by handful or spoonful)
  - Plant seeds (1 at a time or several at once) -or -Transplant Seedlings
  - Water thoroughly (by teaspoonful or cupful or spongeful or by spraying...)
- Run races as a complete process or in stages.
- Award points for best job, for fastest completion, etc.
- Race the clock! How many seeds can you plant in a given time?

### **Planting Relay Game 2:**

- Kids play part of a seed.
- Need to get water, get sun, get soil to fulfill promise of planthood.
- Could use actual water and soil, something else to represent sunlight.

## **I.C. Harvesting and Preparing for Market**

*Because many small-scale diversified New England farms don't use mechanized harvesting methods, they present excellent opportunities for children to participate in harvesting. Children can try hand harvesting, using simple techniques, seeing how a broad variety of crops are harvested.*



### **Harvest Crops:**

- Harvest crops for snack preparation or for the farm.
- Harvest at least once with the regular farm crew, because of the different perspective and added insights the farmers can offer the children. (Also, increased proportion of adults to children helps ensure proper harvesting techniques.)
- Note various aspects of plant's development (plant parts, immature fruit, overripe fruit, etc.).
- Note characteristics of different crops (plant family, plant part to be harvested, how grown, special odor or texture, size, color, etc.)
- Note various harvesting techniques (by hand, using tools, size requirements, etc.)
- Discuss merits of harvesting fresh-picked produce for local markets (peak of ripeness, maximal nutrition, less travel, more sustainable?)

### **Harvest Tomatoes:**

- Compare tomatoes from greenhouse, hoop houses, field (in soil, in black plastic, in black plastic with benefit of slitted row cover in early stages of plant's life).
- Visually note what stage the plants are in, biggest, most productive, etc.
- Weigh the harvest from each area (per number of plants)
- Discuss implications of season extenders on sustainability, economics, productivity, etc.

### **Harvest Summer Squash/Zucchini:**

- Compare squash plants in soil, in black plastic, in black plastic with benefit of slitted row cover in early stages of plant's life.
- Visually note what stage the plants are in, biggest, most productive, etc.
- Harvest zucchini and summer squash.
- Play games with over-large zucchini monsters. (Zucchini baseball!)
- Distinguish male and female blossoms (edible!!).

### **Harvest Potatoes:**

- Compare harvest methods (hand digging, turning over with fork, tractor-driven potato harvester)
- Adult can use potato harvester, children can find potatoes in rows. Like a treasure hunt. Very fun.
- Tubers! Propagate from seed potatoes (eyes sprout!)
- Some edible plants have inedible parts - poisonous leaves and flowers of potatoes - solanine.  
Nightshade family (eggplant, peppers, tomatoes, tomatillos, deadly nightshade...)
- Clues for when ready to harvest (plant dies down).
- Dig and search, how many can you find in a row? Biggest? Smallest?
- Compare varieties (red, fingerling, white, yellow)

### **Harvest Rye or Oats:**

- When grain such as rye is ripe, harvest the seed heads by hand,
- Remove seeds, try various methods (rubbing, crushing, scraping, shaking, stomping)
- Winnow the chaff by pouring from bowl to bowl in wind, or bucket to bucket, experiment with this
- Grind grain into flour for future use.

### **Harvest Flint Corn:**

- Compare flint corn (for flour) with sweet corn (kernel size, texture, etc.)
- Remove husks & take seeds off cob (test different methods, twisting/wringing the cob works.)
- Make corn husk dolls?? Consider other uses besides composting.
- Grind corn kernels into cornmeal for future use.

### **Prepare Produce for Market or CSA Distribution:**

- Wash, weigh, display, pack, store produce.
- Note implications of cosmetic imperfections, insect damage, over-ripe/under-ripeness, disease, etc.
- Note implications of organic production (variation in appearance, worms in corn, no chemical pesticide or fertilizer residues, etc.)



## II. Bio-Diversity on the Farm

*A small, diverse organic farm is an incredibly exciting biological wonderland. Broad-spectrum chemical pesticides aren't used, integrated pest management is practiced, soil health is paramount, havens for beneficial insects are maintained, and careful maintenance of the health of whole-farm mechanism is encouraged.*

*We have divided life on the farm into three categories:*

- *Insects and More (beneficials and pest insects, as well as other "creepy crawly" sorts of things)*
- *Animals (mostly mammals and birds, some pests, others beneficial)*
- *Plants (beneficial ones and those dreaded plant pests known as weeds.)*

*Organic farmers need to make careful decisions about how to deal with pests. There is a balance between respecting nature's creatures and protecting crops and one's livelihood. Likewise, there is an equilibrium in a complete ecosystem. Tampering with natural processes can have unexpected consequences. When teaching children on the farm, it is valuable to introduce the variety of life and encourage observation and critical thinking about the difficult compromises that sometimes need to be made.*

### II.A. Insects and More.

#### **Insect Definition:**

- Generate definition of an insect
- 6 legs, three body parts (head, thorax, abdomen)
- Discuss stages of insect's growth (complete and incomplete metamorphosis)
- Give examples of various stages of metamorphosis (egg, larva, pupa, adult -or- egg, nymph, adult)
- Give examples of things that are and are not insects (e.g. spiders, ticks, millipedes, sow bugs aren't insects)
- Are insects either inherently bad or good? How do they help or hinder farmers?

#### **Butterfly or Moth Metamorphosis Greeting Circle:**

- Use as when introducing to insects, insect life cycle, insect pests, etc.
- May require some prior knowledge of stages of metamorphosis. Could use game to reinforce knowledge.
- All start as "eggs", leader starts greeting circle by saying hello to someone.
- That person becomes a larva and crawls to another egg to say hello, takes that new larva's place and becomes a pupa while the new larva crawls off to greet someone else.
- When all are pupae, leader starts greeting circle again by saying hello to someone.
- That person becomes an adult and flies over to another pupa to say hello, takes that new adult's place and starts eating a leaf until all are adults.
- When all are adults they can fly around for a bit, until it's time to go on to the next activity.

#### **Gather Insects from Fields:**

- Use insect catchers and jars.
- Be careful if and when collecting beneficial or non-pest insects.
- Keep insects in observation jar or tank for a short time, then release.
- Place a butterfly or moth larva in a netted container, feed until it pupates, wait for adult to emerge (long time)

#### **Collect Pests:**

- Depends on what pests are most prevalent, but bean or potato beetles work well.
- Gather data on population size.
- Have a contest when collecting Insects
  - Collect as many insects as you can in a given time! (2 min, 4 min, 10 min?)
  - How many insects can you find in one row?
  - How many insects can you find in a given # of row-feet? (10, 20, 40?)



- How many insects can you find on one plant?
- How many plants do you need to check to collect a given number?(5, 10, 15?)
- How many row feet do you need to check to collect a given number? (5, 10, 15?)
- Largest specimen?
- Ugliest specimen?
- Cutest specimen?
- Find all stages! (*egg-larva-pupa-adult or egg-early nymph-older nymph-adult*)
- Report findings collectively or individually in notebooks or journals.
- Photograph specimens and collection activities.
- Are some pests easier to collect than others? Why might that be? What implications for pest control?
- Display the pests for public viewing. (*For ex, keep the pests in jar or container in farmstand or CSA room.*)
- Feed the pests to the chickens, as a means of using the pests positively. (*web of life*)
- Address the moral issue of killing the insect pests.

### **Beneficial Insects as Pest Controls:**

- Most pests have natural controls, sometimes this can control the pest.
- Aphids consumed by ladybugs and praying mantises.
- Hornworms parasitized by braconid wasps, which lay eggs that hatch into larvae that eventually eat the hornworm.
- Find ladybug larvae and praying mantis egg "sacs" (like meringue)
- Post photographs of beneficial insects in various life stages.

### **Aphids, Ants and Ladybird Beetles - Game:**

- Version of tag, to introduce beneficial insects, inter-relationships, insect pests, etc.
- The ladybugs want to eat the aphids. The ants are nurturing the aphids.
- If a ladybug tags an aphid, either (a) the aphid "dies" and is out of the game, or (b) the aphid "dies" and joins the team of ladybugs.
- If an ant tags a ladybug, the ladybug has to flip over on its back and flail like a beetle that's stuck on its back.
- The ladybug can rejoin the game after it is righted by another ladybug (either symbolically-by tagging- or by actually turning the player over.)
- Rescuer and rescued can do the "aphid boogie" (shimmying up and down with hands held)
- If all of the aphids "die", the ladybugs win.
- If all of the ladybugs get tagged, the ants and aphids win.

### **Pollinating Insects:**

- Pollinators are important for fertilization, sometimes essential.
- Examples include butterflies, bees, ants.
- Pollinators affected by weather, disease, other conditions.
- Play pollination simulation game.
  - Some children are pollinators, others are plants.
  - Simulate various growing conditions to demonstrate various effects on pollinators and crop yields.
  - Early frost kills blossoms, cold rainy weather inhibits pollinators, disease reduces pollinators population...
  - Demonstrate that some plants need pollen from other plant in order to fertilize blossoms (pollinators! yay!)
- Learn about various kinds of pollinators.
- Note existence of self-pollinating flowers in addition to ones that need help of pollinators like wind/insects/birds.

### **Collect Pollen:**

- Make and use pollen-catching cards. (covered with dark velvet, corduroy or similar surface.)
- Collect pollen from different kinds of plants in fields.
- Place card under flower, tap or shake gently to release pollen.
- Compare colors, size, texture, etc.
- Compare ease of pollen-collecting from different sorts of plants.



### **Honeybees:**

- Honeybees are often kept on farms as important workers, pollinating crops.
- Ask a beekeeper to come in and share knowledge, demonstrate special tools, clothing, etc.
- Observe actual hives from a distance, noting bees arriving and leaving (easiest when back-lit by sun)
- Have a display hive available for observation (shows honeybee activity in enclosed hive)
- Learn about different roles of bees within the hive.
- Do a honey bee dance, invent your own signals to show where the good pollen/nectar sources are.
- Sample different kinds of honey, comparing flavor, color, texture of different ones.
- Consider implications and effects of humans taking (harvesting) the honey from the bees.

### **Make Insect Collecting Boxes:**

- make boxes for collecting insects in the field
- can use flat boxes with large baggie taped to one edge  
write names on them (so students can keep track of own)
- tap an insect off a plant, it falls onto box, slides down into the bag
- transfer insect from bag to an observation jar or tank.

### **Display Insect Damaged Plants:**

- Show samples of a damaged, injured or stressed plant, depending on what's available at the time
- Search crops for evidence of insect pests (droppings, holes in leaves, actual insects)
- Consider how insect damage affects crops.
- Note that healthy plants can withstand a certain amount of insect predation and still produce food.
- Examples of damage:
  - Defoliation - bean beetle, potato beetle, hornworm, aphid, flea beetle
  - Disease vector - cucumber beetle, squash bug
  - Food damage - cabbage/broccoli worm

### **Insect Pest Controls:**

- Discuss various methods of controlling insect pests.
- Contrast organic practices with conventional methods.
- Acknowledge use of pesticides (Bt, garlic spray, etc.) and contrast with chemical pesticides.
- Introduce concept of Integrated Pest Management.
- Hand-picking as a control.
- Genetic engineering (e.g. Bt corn) implications for organic growers.

## **II.B. Animals**

### **Introduce Animals on the Farm:**

- Brainstorm different sorts of animals found in the farm environment.  
(e.g. coyote, beaver, crows, livestock, deer, woodchuck, frogs, turtles, snakes, barn swallows, raptors, songbirds...)
- Consider roles played by each and ways they interconnect.
- Introduce web of life, food chain and related concepts.

### **Contributions of Livestock Animals:**

- Consider various animals kept as livestock on farms  
(Actual animals on given farm as well as animals kept on other farms...)
- Why important for health of farm? How do they contribute?
- Produce something, workers, companionship, etc.
- Manure, closing nutrient loop, keeping nutrients on farm, reducing off-farm inputs.  
(e.g. chicken tractors for improving fertility)
- Food (eggs, meat, milk)
- Fiber (sheep fleece, goat/rabbit/alpaca/etc fleece/hair)



### **Care for Chickens:**

- Fill grain and water, change shavings.
- Collect eggs.
- Prepare eggs for market. (Wash, inspect, sort, place in boxes.)
- Bring an egg home to use.
- Compare different breeds of chickens, note various characteristics. (among layers, between layers & meat birds)
- Compare attributes of mature hens and chicks, compare attributes of roosters and hens.
- Collect insects or greens for hens to eat.
- Introduce chicken life cycle.

### **Construct Chicken Tractors:**

- Children help adults construct movable chicken pens of wood, and chicken wire.
- Measure and mark supplies for cutting, assist in assembling frame, fasten chicken wire
- After construction, children can help move the pens to the fields and place the chickens into the "tractors".
- Periodically relocate the tractors, as chickens require fresh ground.
- Discuss advantages and disadvantages of movable chicken tractor pens as compared to permanent pens.  
(manure fertilizes fields, rotates chickens through fresh ground, more vulnerable to predators, non-centralized care...)

### **Care for Sheep & Goats:**

- Fill grain and water.
- Help trim hooves as necessary.
- Help administer health maintenance medicines such as wormer.

### **Sheep Fleece:**

- Have shearer come during sessions to demonstrate shearing methods.
- Pick clean the fleece.
- Wash fleece.
- Dye fleece with natural dyes (onion skins, etc.)
- Spin fleece into yarn.
- Invite spinners visit to demonstrate.
- Felt with fleece (soapy water, working with hands, into balls, vessels, etc.)
- Weave with the fleece (see Section V: Other Activities)

### **Make Goat Cheese:**

- Use goat milk to make cheese
- See Recipes in Section 11.
- Compare goat milk and cow's milk.

### **Introduce Animal Pests:**

- Brainstorm list of different animal pests and how they affect farm production.
- Discuss various means of discouraging animal pests.
- Evaluate implications for organic farmers.

### **Pests on the Farm:**

- Go on a "field trip" for evidence of animal pests and ways farmers try to protect their crops and livestock
  - Deer - tracks/scat, nibbled lettuce/beans/peas/squash, (fences)
  - Woodchucks - holes, nibbled beans/lettuce/peas (no good protection)
  - Birds - berries, squash (netting)
  - Rodents - scat, grain bags chewed, crops chewed (use traps)
  - Predators - scat (fences, pens for livestock)



## **Rodent Pests:**

- Play recording of The Woodchuck Song, sung by Anne Dodson. (Lyrics document drama of woodchuck removal.)
- Display various sizes of Hav-a-hart traps (mentioned in song.)
- Consider intended uses of each size. (Mice, rats, etc.)
- Discuss implications of relocation, ease of trapping, etc.
- Explore function of traps.

## **Make Garden Spirits:**

- Children make "Garden Spirits" for distribution around the farm, or to take home.
- Play tape of gardening/earth songs during work.
- For brainstorming: Show some illustrations from Scarecrows. Use as a reference during project.
- When done, have an Installation Ceremony, placing them around farm, in fields.
- Teach the Garden Spirits how to "be scary", protect the plants, inspire growth, deter pests, etc.
- Think of them as spirits, talismans, etc.
- Connect to mythology, folklore, tradition, etc.
- Name the Garden Spirits
- Info cards on Garden Spirit could include name of G. Spirit, name of creator, description of what they're designed to do and how they do it, function, form, etc. (Info on each Garden Spirit could be placed in baggies and stapled onto each or could be on laminated cards. Sharpie ink will fade, so use non-fading ink such as ball-point pen.)
- Indicate locations of Garden Spirits on a posted farm map.

## **Tools & Equipment:**

Hammers, Scissors, Pliers, Wire-cutters (ones that are safe for kids - pliers, not tin snips)  
Embroidery needles?, Roofing nails, Small common nails, Hammer-in staples, Staple gun (Adults only!)  
String, Fishing line, Rope, Baling twine, Wire - fine gauge, Duct tape

## **Materials:**

Uprights with point - cut stakes ahead of time - size of large sign posts  
Cross-pieces - a variety of lengths and sizes  
Wire Hangers, Old clothes, yarn, cloth, ribbon, plastic bottles, aluminum pie pans,  
Noisy or scary "Junk" - tin foil, cardboard, cd-roms, shells, cans, jar lids, etc.  
Old or broken tools, old or broken gadgets, interesting things from above D's sheds  
Buttons, beads, etc.  
Paint, Straw

- Have kids bring a "special thing" from home to add to their Garden Spirits
- Begin with mini-lesson on using hammers and nails (*tap-tap-tap then bang-bang-bang*)
- Kids can nail together the wood pieces, and then assemble their Garden Spirits.
- Older kids and teachers will assist youngest students as needed.

## **II.C. Plants**

### **Plant Identification:**

- Introduce taxonomic features to classify plants. (e.g. alternate/opposite leaves, leaf color, texture, fruit type, etc.)
- Do example activity - sort people according to visible attribute (e.g. blond/not-blond, jeans/no-jeans, hat/no-hat)
- Connect to ways one can sort crops.

### **Plants on the Farm:**

- Brainstorm different sorts of plants found on the farm and roles they play.  
(e.g. trees, wildflowers, crops, bushes, etc.)
- What's use of non-cultivated crops? (e.g. wind-breaks or hedges, erosion control, food, shelter, habitat, diversity)

### **Introduce Cover Crops:**

- What is function of cover crop?



- Why are they important? (Hold soil, provide nutrients, increase organic matter in soil, house beneficial insects...)
- How do different cover crops serve different functions?

### **Sow a Cover Crop:**

- Seed a field or seed between rows of plantings.
- Broadcast seeds with shaker cans.  
(Coffee cans with nail holes in them).
- Try spinner broadcaster.
- Possible crops to sow: clover, buckwheat, rye, oats, etc.

### **Introduce Weeds:**

- What's a weed?
- Why are weeds a problem? (shading or choking crops, competing for nutrients, inhibiting efficient harvesting...)
- How do weeds propagate? (examples of galinsoga, purslane, quackgrass, mustards...)
- How is a weed different from a crop?
- Weeds are plants growing where you don't want them! Nothing necessarily inherently wrong with a weed plant.
- What are ways weeds can be controlled? Which of these are used by organic growers? Why?
- Introduce genetic engineering as weed control mechanism (e.g. Round-up Ready Soybeans). Discuss implications.

### **Weed Cultivation Techniques:**

- Why Cultivate? Why weed?
- Spend 15-20 minutes weeding a crop that is straightforward for kids to distinguish... (e.g. next season's strawberries, onions & leeks, asparagus, rhubarb, echinacea)
- Pull larger weeds, use hand tools for smaller weeds (bury and uproot them)
- Have a weed tool sampling session.
- Try various hand tools (hoe, scuffle hoe, stirrup hoe, rake, small diggers, wheel hoe).
- Rate each for usability, efficiency, speed, etc.
- Test a given tool with different circumstances.  
(Some tools are better for small weeds, others are better for coping with large ones.)
- Watch demonstrations of tractor cultivation methods, rototiller methods, flame weeding. Discuss costs and benefits of each, as compared to methods we've tried.
- Dispose of weeds (feed animals, put in compost, mulch between rows)
- Highlight importance of weeding before the weed plant goes to seed.

### **Edible Weeds:**

- Introduce notion of edible weeds.
- Emphasize importance of knowing what you are harvesting! Dangerous plants out there - toxic! Esp. for kids.
- Harvest edible weeds such as purslane, red clover, pigweed, lamb's quarter, dandelion
- Sample them for taste.
- Make an edible weed salad for snack.
- Collect examples of all weeds (leaves, small seedling and large plant, as much root as possible)
- Later identify and mount samples for selves, or for display

### **Mulch:**

- Mulch something that needs mulching - for moisture and for weed control  
(e.g. crops in the CSA PYO Garden or farm crop like asparagus, rhubarb, echinacea, perennials)
- Dig under a bed of existing mulch to see what's there.
- Use hand lenses to examine fungi, insects, etc.
- Compare black plastic mulch to hay or straw mulch.  
(Temperatures, plant life, insect life)
- Connect to understanding of plant biology - why does mulching help control weeds? plants need light!



### **Flowers (Wildflowers and Crops):**

- Identify different types of flowers - pick at least one of each type?
- Pick examples of different sorts of flowers.
- Take home a bouquet of different types.
- Dissect flowers - identify and examine flower parts.
- Collect pollen with Flower Powder cards (See Section II.A.: Insects and More)
- Pound flowers (See Section V: Other Activities)

## **III. Weather (Meteorology)**

*Weather is a critical factor in farming because it is an essential variable that ultimately cannot be controlled. Warmth, wind, light and moisture and seasonal changes all directly affect plant health and productivity. However, the weather and climate can be "pushed" in some ways - optimizing conditions as much as possible. Children are encouraged to pay attention to the weather conditions on the farm.*

### **Introduce Weather:**

- Brainstorm various weather conditions and ways they help or hinder agricultural enterprise.
- Precipitation (rain can give needed moisture, snow cover can insulate in winter, heavy rains, hail, snow, sleet can damage crops, extended rain can impede cultivation or planting of crops)
- Wind (breezes can aid pollination, extreme winds can damage crops)
- Cold (sometimes important for dormancy, germination, etc., excessive cold can damage crops.)
- Sun (energy from sun provides crops w/ energy to grow, heat warms earth, too much sun can damage crops)

### **Monitor the Weather:**

- Track weather conditions over time.
- Include air temperatures, precipitation, wind direction, barometer readings, general conditions, etc.
- Graph temperatures and precipitation over time, on a large chart for easy sharing in group.
- Encourage visuals (graphics to represent various conditions)
- Discuss implications of various weather patterns on farm (crops, worker morale, etc.)

### **Pushing the Weather:**

- Examine some of the ways the farm "pushes" the climate and weather
- Season extenders (pros, cons, cost-benefit analysis)
- Heated greenhouse, unheated poly-tunnels, black plastic mulch, slitted row covers, remay, drip irrigation)

### **Monitor Soil and Air Temperatures:**

- Track various soil temperatures and air temperatures over time.
- Graph on a chart for easy comparison.
- Use compost thermometers, soil thermometers, and air thermometers with max/min indicators.
- Discuss how air and soil temperatures affect productivity of the farm and how they affect sustainability.
- Connect to temperatures and seasons and how plants' "biological clocks" run faster in warm temperatures (more leaves unfold, faster photosynthesis.)
- Compare Soil Temperatures in various locations:
  - in the fields, under black plastic mulch, under straw mulch, under floating row cover, under slitted row cover, in hoop houses, in greenhouse
- Hypothesize why there are differences in temperatures under the different soil covers.

### **Study Irrigation:**

- Inspect various methods of irrigation (irrigation faucets, sprinklers, irrigation tape, drip hoses).
- Turn on a sprinkler to see how it works.
  - How much area can it cover?
  - Set rain gauge under its coverage area to measure "rainfall".



- Check soil moisture after irrigating with various methods.
- Compare relative moisture informally or with technical equipment.
- Notice the patterns of water movement in the soil.
- Consider environmental impact, cost, efficiency of different irrigation methods.
- Connect to plant's requirement of water (plants are mostly (90%) water, and need water to stay turgid and to grow.)

## IV. Food Preparation (Cooking with Whole Foods)

*An important part of sustainability is the consumer's use of fresh, locally-grown, whole foods. Our society is tempted by convenient processed foods, and as a result, many children do not have the experience of eating or preparing meals from fresh vegetables, whole grains, or even baking sweet treats "from scratch". Involving children in preparation of snacks or meals is an important (and fun!) educational component of any agriculture education program.*

We stocked our farm kitchen as we would our home kitchen, with all of the usual ingredients and implements. A few specific tools were extremely useful when working with groups of children. The grain mill was used on almost a daily basis, whether grinding purchased wheat berries, spelt berries, or rye berries into flour or grinding things from the farm, such as corn into cornmeal, oats into oat flour, or rye seeds into flour. Keep in mind the dual goals of safety and independence, and consider having more than one of a given tool or implement, to allow more kids to try a task in a given amount of time.

- Hand-cranked grain mill (Essential!)
- Hand-turned egg-beaters (not electric)
- Garlic press
- Pastry blender
- Chopping gizmo (self-contained, like those used for chopping nuts)
- Butter knives (average not-so-sharp table knives)
- Potato mashers
- Graters, especially the 4-sided ones that stand upright on their own
- Measuring cups
- Measuring spoons
- Mixing bowls of plastic or metal (large, medium, small)
- Mixing spoons, whisks
- Additional plastic or metal bowls
- Cutting boards and plastic plates (the more the better)
- Sharp knives (one or two, for adults only!)
- Timer (essential!)

The recipes we used are noted in Section 11. It was important to share the recipes with the participants at the end of each session. The brief introduction to the recipes helped explain our reasoning and notes in each recipe reminded parents that cooking with whole foods invites infinite variation and experimentation.

## V. Other Activities

*Some activities fit into multiple categories or are especially suited for the first day. Others aren't necessarily directly connected to farming, but are interesting and engaging for the children, often stimulating critical thinking or utilizing special talents. We include those activities here, acknowledging that they could fit in other content areas, depending what suits the needs of the organizers and participants.*



### **Introduction Game (first day):**

- Divide group into pairs using "Noah's Ark" vegetable variation.
- After pairing up, each person's task is to find out a bit about partner. Then relay info to rest of group.  
(Tell your partner your name, hometown, and what vegetable, fruit or flower you would be - and why.)
- Adults model beforehand to help clarify task.

### **Review Safety Expectations (first day):**

- Review expectations and Safety Sheet, reminding them of important guidelines.
- Safety Sheets sent home with registration materials before camp.
- Copies of important Adventures in Agriculture guidelines should be on the back of our clipboards and newsprint pads covered w/ clear contact paper - for use as reminders.

### **Scavenger Hunt (first day):**

- Distribute scavenger hunt list and clipboards - in age-mixed teams of 3 or 4
- Scavenger hunting will be on-going throughout "tour" time. Helps give kids a focus during the tours.
- One scavenger list per group, one writer/recorder at a time.
- Let each group decide whether to take turns, only one person record, etc.

#### **Have you seen these things on the farm?**

1. An animal \_\_\_\_\_
2. Insect homes \_\_\_\_\_
3. Farm equipment \_\_\_\_\_
4. A planted crop \_\_\_\_\_
5. A plant that will make you itch \_\_\_\_\_
6. Someone who works at the farm \_\_\_\_\_
7. A farm building \_\_\_\_\_

### **Tours of Buildings and Fields (first day):**

- **Farm buildings:** Include animal stalls, tool shed and equipment to avoid, greenhouse, CSA room, farmstand, barn, washroom, bathroom, first aid, water spigot, poison ivy, stinging nettles, bee hives, etc.
- **Fields:** Hayride tour of more remote fields. Include hoop houses, fields, blueberries, compost piles, far fields, hayfields, bee hives, deer fencing, woodchuck holes, likely poison ivy strongholds, etc.

### **Name Game (end of first day):**

- Circle game that involves saying each other's name (and recalling what vegetable or fruit they would be...)
- Roll (or toss) an object (tennis ball, beanbag, stuffed creature, actual vegetable) from one person to another
- First person names the intended receiver as the ball is released.
- Try to make sure everyone has a turn.
- Could add two or more objects, for excitement.
- At the end, see who wants to attempt naming everyone in the group.

### **Make Wonder Veggies:**

- Kids invent and make creatures or people from food. (Inspired by Play With Your Food by Joost Elffers)
- Supplies include: variety of interesting shapes and sizes of vegetables, especially "seconds"
  - seeds, beans for eyes, etc.
  - common pins, toothpicks and popsicle sticks to hold parts together
  - knives (butter knives for kids and a couple really sharp ones for adult helpers to use)
- Collect interesting vegetables throughout Adventures in Agriculture, with help from farm staff.
- Could go looking for vegetables just before the activity.
- Eat the art, or let it dry out, or place in a special spot, or put on compost pile, or take it home.



### **Nature Sculptures:**

- Kids create impermanent or semi-permanent art with natural materials. (Inspired by Andy Goldsworthy)
- Introduce by showing samples of Andy Goldsworthy sculptures.
- Could cut apart and laminate specific useful pages of his books.
- Can work in groups or alone.
- Share works of art when finished (a tour of the art museum)
- Create sculptures in highly visible space (for public and other farmers.)

### **Flower and Leaf Pounding:**

- Extract permanent and semi-permanent dyes from plant matter by pulverizing with hammers.
- Place flowers, leaves or stems onto cloth or heavy paper
- Cover with a piece of waxed paper, plastic wrap, or plain paper.
- Pound the plants, transferring the colors to the cloth or paper.
- Discuss different colors extracted. Any surprises?
- Compare color-extracting properties of different plants.
- "Fix" the colors more permanently to cloth by soaking in salt solution or vinegar or both.
- Attach colored cloth to sticks or twigs to make a flag. (Use nails or staples.)

### **Lavender Wands:**

- Cut a 2-3 yard strip of 1/4 or 3/8-in ribbon.
- Harvest 13-19 stems of fresh lavender (need odd #)
- Cut stems 10-12" long.
- Harvest when at least 1-2 flowers open.
- Strip any leaves off stems.
- Bunch the stems just below the flowers, wrap rubber band around the stems.
- Hold flowers toward you, and stems away from you.
- Tuck one end of ribbon under 2-3 flower heads and push ribbon up against the rubber band. Wrap tightly 1-2x.
- As you bend the stems down toward you, weave the ribbon under and over the stems, one at a time. Hold the stems in place with your non-weaving hand until you have woven the second or third rows.
- Continue to weave the ribbon over and under the stems. After the first row, when the stems are all bent down toward you, you'll need to slide the ribbon under a stem, bringing it up close to the ribbon in the preceding row.
- Bring each new row of ribbon up against the preceding one.
- If the ribbon was under a stem in the previous row it should be over that stem in the current row (and vice versa.)
- When complete, the flowers will be inside the wand, with the stems bent down around them. The ribbon will be woven through the stems and tied off at the end.
- For detailed directions, written by Carol Cox and illustrated by Sue Ellen Parkinson, contact Ecology Action 1993, 5798 Ridgewood Road, Willits, CA 95490-9730.

### **Weaving on Looms:**

- Weave natural materials using a variety of looms.
- Materials could include found-materials, weeds, flowers, twigs, fleece, cloth scraps
- Make simple cardboard or foam core looms by wrapping string in parallel rows around heavy cardboard rectangles that have regularly spaced slits at the top and bottom (helps secure the string if you slide it into the slits).
- Make simple wooden looms by nailing two parallel rows of nails onto a flat rectangular piece of wood (pine boards worked well, since they are easy to nail into.) Wind the string around each nail, creating parallel rows of string to weave materials into.
- Make a large-sized wooden loom by constructing a rectangular frame of pine boards, with two long ends to bury into the ground (so that the loom stands vertically in the ground). Before placing the loom in the ground, nail two parallel rows of larger nails into the wood. Wrap heavier gauge string or twine around each nail. Then dig holes for the "posts" and place loom vertically. Use as a group loom, for weaving weeds and other natural materials. A great agricultural art object for farm visitors to enjoy.
- Demonstrate weaving on an actual loom, with a guest weaver.



## Journals:

- Kids record words, illustrations in journals.
- Place for observations, insights, things they want to remember later.
- Can be shared with group formally, shared with friends informally, not shared at all...
- Pre-writers have help with words from older children or staff
- Helps to have daily time for this: before or after lunch worked well for us.
- Connect to farmers who need to keep records to remember what worked, what didn't, conditions, etc.

## Visualize Seeds:

- Collect variety of seeds and have samples on display (labeled with pictures and/or words).
- Do one or both of these activities in pairs.
- A** - Someone sits behind you, describing the seed. Draw that seed, "get a picture in your mind", or guess which one it is of the seed samples on display.
- B** - Individuals are given a seed to hold behind their back. Guess which seed they are feeling behind their back (connecting sense of touch with sense of sight.) Seed samples on display (labeled with pictures and/or words).

## Blindfolded Garden Walks:

- Threesomes (2 guides, one on each side of blindfolded person) or Twosomes (1 blindfolded, 1 guide)
- Could transport to crop areas with golf cart, or could all walk there before being blindfolded.
- Blindfolded person tries to identify plants
  - feel leaf, stem, fruit
  - smell crushed leaf, fruit, flower
  - taste edible plant parts (\*Note\* If both sighted partners aren't positive it's edible, don't feed it to them!)
- Give more hints until successfully guess plant
- Change roles after successful guess

## Construction Projects:

- In small groups with a small student:adult ratio, older children can participate in more ambitious construction.
- Replace ramp at one end of barn.
- Build a shelter for sheep and goats.

## Daily Chores:

- Purpose of chores is to give students responsibility for important tasks on farm.
- Introduce each task as a whole group during farmyard tour, continuing to acquaint with the farm as we go.
- Explain that in future, students will do chores in smaller groups.
- Divide chores into two or more sets, with an animal chore and observation work for each set.

**Young Chicks:** Clean coop, add fresh shavings, fill water & grain.

**Laying Hens:** Collect eggs, fill water and grain, feed plants & insects, let outdoors  
If collect eggs, may need to do at end of day b/c they'll be nesting in morning.  
Collect eggs into egg cartons to reduce breakage likelihood, wash eggs if desired.

**Roosters:** Move chicken tractor to fresh spot, fill water, grain.

**Rabbit:** Fill water, grain, hay, plants (parsley, lettuce, carrot tops, etc)

**Goats/Sheep:** Fill water, grain, hay, plants (weeds, extra produce)

**Weather:** Record daily rainfall, high-low-current temps, barometer, wind, general conditions  
Introduce various instruments for measuring weather  
Use chart to document data and graph changes in temperature over time.  
Share data with rest of group.

**Compost:** Record daily temperatures of 3-bin compost system. Graph changes over time.  
Turn (into next bin) if temperature is going down.  
Add materials as necessary.

**Greenhouse:** Water, weed, general care.  
Record greenhouse temperatures, graph over time.



## **6. SONGS:**

*Singing helped build our Adventures in Agriculture community. We chose to learn just a few songs and repeat them throughout the week rather than singing something different (and even unfamiliar!) each day. These are some songs you can find recorded or written out on sheet music. Rise Up Singing is a great songbook, although it presumes you know the melody. Some sources for these songs are indicated.*

### **Root, Stem, Leaf, Flower, Fruit, Seed**

#### **Dirt Made My Lunch**

##### **Let it Grow**

**Gardening** (recorded by the Amidons)

#### **Inch by Inch (The Garden Song)** (composed and recorded by Dave Mallett)

Inch by inch, row by row, gonna make this garden grow.  
All you need is a rake and a hoe, and a piece of fertile ground.  
Inch by inch, row by row, someone bless these seeds I sow.  
Someone warm them from below, 'til the rain comes tumbling down.  
(This is the chorus)

#### **De Colores** (recorded by the Amidons)

De colores, de colores se visten los campos en la primavera  
De colores, de colores son los pajaritos que vienen de afuera  
De colores, de colores es el arco iris que vemos lucir  
Y por eso los grandes amores de muchos colores me gustan a mi (2x)

Canta el gallo, canta el gallo con el quiri, quiri, quiri, quiri, quiri  
La gallina, la gallina con el cara, cara, cara, cara, cara  
Los polluelos, los polluelos con el pio, pio, pio, pio, pio  
Y por eso los grandes amores de muchos colores me gustan a mi (2x)  
(Gallo = rooster, gallina = hen, polluelos = baby chicks)

#### **Simple Gifts**

'Tis a gift to be simple, 'tis a gift to be free, 'tis a gift to come round where we ought to be.  
And when when we find ourselves in the place just right, it will be in the valley of love and delight.  
When true simplicity is gained, to bow and to bend we will not be afraid.  
To turn, turn it will be our delight, til by turning, turning, we come round right.

#### **Woody Woodchuck** (composed by David Dodson, recorded by Anne Dodson)

1. Well, I love to plant my garden in the spring,  
And I love to watch those seeds come up, oh it's my favorite thing.  
And I never thought I'd see the day a big gray cloud would pass,  
But then I saw that woodchuck in the grass.

2. That night I had a most disturbing dream  
Of total ruination of my brussels sprouts and beans.  
Next morning when I woke up, I went out on the lawn.  
Almost half the garden was gone.

Hey woody woodchuck, woody woodchuck, woody wood,  
I'd love to feed you if I could.

Woody woodchuck, woody woodchuck, woody wood, please,  
Oh please, don't eat my broccolis.

(more verses outline the trials and tribulations of removing and relocating the woodchuck...)



### Farmer David Had a Farm

Farmer David had a farm, e-i-e-i-o, and on that farm he had a sheep, e-i-e-i-o,  
with a "baa- aa-aa" here and a "baa- aa-aa" there, here a "baa- aa-aa", there a "baa- aa-aa",  
everywhere a "baa- aa-aa", Farmer David had a farm, e-i-e-i-o.

(Same song as "Old MacDonald," but naming the farmer and the creatures found at Mill Valley.  
Besides the regular farm animals, the kids thought of ticks sucking, potato beetles chomping,  
worms wiggling, bats flying, children cheering and more!)

### Flower, Leaves, Stem and Roots (to tune of Head, Shoulders, Knees and Toes)

Flower, leaves, stem and roots, stem and roots

Flower, leaves, stem and roots, stem and roots

The flower makes the seed inside the fruit,

Flower, leaves, stem and roots, stem and roots

Motions: flower - touch head or face with a big attention-getting smile!

leaves - shake hands out to sides

stem - indicate body with sweeping downward motion

roots - touch ground or feet

seed - cup hands together as if holding something precious

fruit - indicate a fruit shape by making heart or circle shape with hands in air.

### The First Thing I Had Was a Little Seed

The first thing I had was a little seed (3x) Oh, lordy don't I love my garden.

The next thing I had was a little root...

The next thing I had was a tender shoot...

The next thing I had was a tiny leaf

The next thing I had was a (whatever crop you want...)

The last thing I had was a tasty feast... (or whatever...)

### Mud, Mud, I love Mud

Mud, mud, I love mud. I'm absolutely, positively, wild about mud.

You can't go around it. You have to go through it. Beautiful, fabulous, super-duper mud.

### My Roots Go Down

Chorus: My roots go down, down to the earth, my roots go down, down to the earth,  
My roots go down, down to the earth, my roots go down.

Verses:

I am a rock, learning to be still (3x), my roots go down.

I am the water, flowing once again...

I am a seed, waiting for the spring...

I am a bird, singing to the day...

(This is an add-on song. Encourage participants to create new verses. Some of ours are below.)

I am a ladybug, eating up an aphid...

I am a barn swallow, learning how to fly...

I am a rooster, crowing really loud...

I am a seed, sending up a shoot...

### Oh Look, There's a Chicken on the Barnyard Fence

(A crazy, chanted two-part round of sorts. With motions.)

1. Can you dig that crazy gibberish?

(digging motion, continue through whole verse)

Can you dig it? Can you dig it?

Can you dig that crazy gibberish

can you dig it, can you dig it?



2. Oh look, there's a chicken on the barnyard fence,  
Oh look, there's another one coming down the road.  
Baw-awk! Baw-awk!  
Get that son-of-a-gun offa (off of) my tractor!

(shield eyes with one hand and point with other)  
(look and point in other direction)  
(cup hands at sides of mouth, move head back)  
(gesture with thumb pointed back over shoulder,  
as an umpire signaling an out)

### **Click, Click, That's How the Shears Go** (recorded by Carla Sciaky)

Down by the pen, the old shearer stands,  
grasping the shears in his thin bony hands.  
Fixed is his gaze on a bare-bellied ewe.  
If he gets another, oh lord won't he blow.

Chorus: Click, Click, that's how the shears go.  
Click, click, so awfully quick.  
You pull out a sheep, she'll give you a kick,  
And still hear your shears going click, click-click.

You take off the belly wool, clean out the crotch,  
Go up the neck for the rules they are such.  
You clean round the horns, first shoulder go down,  
One blow up the back and you then turn around.

In the middle of the floor, in his cane-bottomed chair,  
it's the boss of the board with his eyes everywhere.  
He notes well each fleece as it comes to the screen  
He pays strict attention that it's taken off clean.

## **7. GAMES:**

*Games also helped us create a sense of community. Children respond readily to activities when they are presented as a game, in a playful spirit. Many lessons can be learned through games, both explicitly and implicitly. Almost any game can be modified for use as an educational tool, so feel free to invent your own! If you need additional inspiration, there are great games in Digging Deeper and in The Cooperative Sports and Games Book.*

### **Crows and Earthworms:**

- Playing field 10'x20' or larger.
- Someone is crow and stands in middle of playing field.
- All others are earthworms, divided into two sets - one at either end of playing field.
- Crow says "Earthworms Earthworms, cross my garden if you dare!"
- Earthworms try to cross to opposite side, w/o being tagged by crow.
- If tagged, earthworms become crows for next pass, saying "Earthworms Earthworms, cross our garden if you dare!"
- Play continues until everyone has been tagged and become a crow, participants tire, or time runs out.

### **Seed Planting Relay:**

- Assemble all of necessary things for planting
  - Put soil in containers (by handful or spoonful)
  - Plant seeds (1 at a time)
  - Water thoroughly (by teaspoonful/cupful)
- Races could be in stages - and also could give points for best job (not just fastest)
- Could be racing the clock - how many seeds can you plant in a given time?



### **Hot Potato:**

- Sit in circle, except one, the farmer.
- Those in circle pass the potato until the (eyes shut?) farmer says "Time for Yowza!" (lunch break)
- Person with potato has to race farmer to the "snack bag" and back to vacant spot?

### **Ladybugs, Aphids and Ants:**

- A modified version of tag.
- The ladybugs want to eat the aphids. The ants are trying to protect the aphids.
- If a ladybug tags an aphid, (a) the aphid "dies" and is out of the game, or (b) the aphid "dies" and joins the team of ladybugs. If an ant tags a ladybug, the ladybug has to flip over on its back and flail its limbs like a beetle that's stuck on it's back. The ladybug can rejoin the game after it is righted by another ladybug (either symbolically -by tagging- or by actually turning the player over.)

### **Noah's Ark:**

- A fun way to find a partner.
- Pass out cards with pictures of different animals, vegetables/fruits, farm equipment, etc. Partner up by making a signal, sound, gesture for your card to find your match(es). Possible methods are as animals or crops.
- 1. *Animals:* (make typical noises and gestures) goat, sheep, rooster, hen, rabbit, honeybee, cat, farmer (drive tractor or plant seeds), farm worker ("when's yowza?"), cow, horse...
- 2. *Vegetables/Fruits:* onion (cry, rub eyes), apple (shine on shirt), strawberry (squat down, pick lots and eat), carrot (pull up), corn (eat an ear of corn, pull earlobe), pumpkin (jack-o-lantern smile), watermelon (spit seeds), cucumber (make a sour pickle face), zucchini (swing like a baseball bat), hot pepper (make burning mouth face)...

### **Plant Part Memory:**

- Played like memory or concentration, using cards with pictures of various food crops.
- Player (or team) w/ most matches wins.
  - a. Play to get exact matches (e.g. parsnip & parsnip)
  - b. Play to get match of plant part  
(e.g. parsnip & carrot are both roots, asparagus & celery are both stems, lettuce and kale are both leaves...)

### **Plant Part Go Fish:**

- Played like "Go Fish".
- Each player is dealt 3-5 plant part food cards. Taking turns, ask other players for the food so you can get a match.
- Could get to go again if you get a match, or could just go to next person.
- Player (or team) with most matches wins - or- first player to get rid of all cards wins.
- Play to get exact matches (e.g. parsnip & parsnip)
- Play to get match of plant part  
(e.g. parsnip & carrot are both roots, asparagus & celery are both stems, lettuce and kale are both leaves...)

### **Twenty Questions:**

- Asking only yes or no questions, the guessers try to determine what the leader is thinking of.
- The correct guesser gets to lead the next round, thinking of something else.
  - a. "I'm thinking of a food..."
  - b. Use plant parts to narrow the field. ("I'm thinking of a food that is a root.")
  - c. "I'm thinking of something on the farm..."
  - d. Narrow the range of possibility: "I'm thinking of a farm tool, ... of a farm animal, ... of a farm product."

### **Vegetable Game (Beet, Beet, Carrot, Carrot...)**

- A variety of "No more laughing, no more fun, cannot show your teeth or tongue" game
- Sitting in a circle, all choose a vegetable to call themselves.  
(Each player has different vegetable - no duplicates)
- Player starts, says own vegetable name 2x w/o showing teeth, then says name of another vegetable 2x again w/o showing teeth (e.g. "carrot carrot, beet beet")



- That person says own vegetable name 2x and another vegetable 2x (e.g. "beet beet, bean bean")
- When you show teeth you're out (disqualified)
  - Ways to show disqualification (leave circle, remove a badge, lie on belly, etc.)
- No fair covering face with hands!
- Play until a champion is determined or until your faces hurt too much to go on any longer...

### **Vegetable, Vegetable, Chicken**

- Played like "Duck, Duck, Goose."
- All sit in circle.
- Person who is "it" walks around circle tapping others on head and naming a variety of vegetables (e.g. carrot, zucchini, tomato, corn, pepper, bean...) until says "chicken" and that person races around circle to see if can catch the "it" person before returning to empty spot.
- (or) Person who is "it" simply says "vegetable, vegetable, vegetable... chicken", as in duck duck goose.
- Can run like a chicken, squawking happily.

### **Zucchini Baseball**

- Played with oversized zucchini as the bats and foam balls. Very messy, but fun.

### **Chicken Tag**

- Play tag with a rubber chicken as the tagging item or the "unfreezing" item. (wield chicken gently!)

### **Worm Relay Races**

- Have relay races as worms, crawling over grass, must wiggle to get there. Very messy!

## **8. OPENING and CLOSING CIRCLES:**

*Building community is one of the reasons we do educational programs. It is important to provide a means of coming together as a group, sharing with each other, learning about each other, having fun together. Besides games and songs, we use group activities like those below. By starting and ending our day in this way, we help the children and us to focus and come together with intention.*

### **Sharing Circle:**

- Sit in a circle and imagine a beautiful bowl or harvest basket in center. All going to be adding something to the basket. (Perhaps something they had never seen before, sthg. new they learned, sthg. they had never done before, sthg. that was just cool!)
- Close your eyes, think about the day, and choose one thing that was special
  - (Can show they're ready by opening eyes, thumbs up, okay sign, or other signal.)
- Ask for volunteer to begin, go around the circle until everyone has spoken.

### **Sitting Circle:**

- Make a circle (standing hand in hand) then move to center (shrinking circle 'til shoulder to shoulder)
- All turn to right, move to center shrinking circle further, until as close as possible.
- SLOWLY and simultaneously, everyone sits down on lap of person behind them.
- Should be able to have everyone sitting (until collapses into hilarity)
- Best with similarly-sized bodies adjacent. (Perhaps more challenging for wide age range due to varying body size.)
- Can tie in with content, such as a "Germination sit", with some kids as water, some warmth, some as air, etc. (requirements of germination). Demonstrates inter-connectedness. If one group is removed (e.g. water) then the whole thing falls apart. All are needed!

### **Squeeze Circle:**

- Interconnection: with all eyes closed, holding hands in circle, someone starts gentle squeeze. Pass on to next person, eventually the squeeze makes its way around the circle, and all open eyes. Great ritual. Easily modified.



### Greeting Circle:

- Purpose is to build community, get to know one another, have fun.
- Sit in a circle. Start with a volunteer who greets someone in the circle with a big hello (and handshake), that person greets another, and so on until all have been greeted.
- Can go right around the circle, or can go randomly (harder because you need to remember who has been greeted already and who's waiting.)
- Can do greetings by tossing or passing a beanbag or vegetable.
- Cow/Goat Milking Greeting: Interlace fingers and invert hands so thumbs point down like an udder. Take turns being the udder and being the milker (who says hello, good morning...)
- Goat Greeting: Use a goat-y voice to say good morning. ("Good maaaa-ning \_\_\_\_")
- Infinite variations in Morning Meeting Handbook produced by Northeast Foundation for Children.

### Make Rain:

- Sit in a semi circle. Leader sits or stands in the "center".
- Participants imitate the motions of the leader as she faces them one at a time (as in a "wave").
- Should sound a little like a passing rainstorm.
- Motions are as follows: rub finger tips together, rub palms together, snap fingers alternating hands (or tap fingers), slap hands on thighs, snap/tap fingers, rub palms together, rub fingertips together.

### Insect Metamorphosis Greeting Circle:

- Use as introduction to insects, insect life cycle, insect pests, etc.
- All start as "eggs", leader starts greeting circle by saying hello to someone.
- That person becomes a larva and crawls to another egg to say hello, takes that new larva's place and becomes a pupa while the new larva crawls off to greet someone else.
- When all are pupae, leader starts greeting circle again by saying hello to someone.
- That person becomes an adult and flies over to another pupa to say hello, takes that new adult's place and starts eating a leaf until all are adults.
- When all are adults they can fly around for a bit, until it's time to go on to the next activity.

### The Big Wind Blows:

- All participants stand in a circle, on own designated spot (mat, poly-spots, etc.)
- Leader stands in center, says "The Big Wind Blows on anyone who..."  
Leader names a category relevant to camp (or relevant to personal life, if an introduction game)  
for example: anyone who ...likes lettuce  
...found an adult bean beetle  
...fed the sheep  
...collected eggs today  
...has an older sister
- Anyone who fits that category must change spots (being blown by the wind!)
- Can't be an adjacent spot
- Person left in middle without a spot is new leader
- If children are vying for leader spot, can make limit on # of times can be leader (e.g. 2x and you are out...)

### Fabulous Farmer Certificates (closure activity on last day):

- Give all participants a somewhat fancy certificate that says something like: "This certifies that \_\_\_\_ was a fabulous farmer during Adventures in Agriculture at Mill Valley Farm because \_\_\_\_\_"
- Meet in small groups (e.g. the chore group), to brainstorm ways that each person was a fabulous farmer.
- After hearing kudos, the person being acknowledged chooses three things to have written on his or her certificate.
- After the certificate is completed, everyone in the camp session signs the bottom. (Can be somewhat arduous for younger children. Could do in assembly line fashion, with all certificates in a line on clipboards, children moving from one to next, with swifter writers at beginning of line. Games afterward.)
- Depending on size of group and energy level, could present the signed certificates at the end of the day, in front of group, reading the attributes that made that child a fabulous farmer.



## 9. GENERAL PROGRAM INFORMATION:

### **Students' Clothes and Backpacks:**

- Store on hooks (or nails) in barn or on tables in CSA room.
- Space for kids to leave extra clothes and wet weather gear at farm throughout session.

### **Lunches:**

- Store with student stuff. (Request that each student bring lunch in mini-cooler or insulated bag.)

### **Tools:**

- Clean after each use and put back where they belong. (Use linseed oil for end-of-season cleaning)

### **Wheelbarrow/Cart:**

- Use a Garden Way Cart
- much easier for kids to control than a wheelbarrow and has large flat space for plants, supplies, soil samples, etc.

### **Radios:**

- Have a farm radio with us always, in case of an emergency.
- Use other radios to communicate with each other when in separate groups, coordinate timing, etc.

### **Adventures in Agriculture INFO NOTEBOOK**

- Store it in the farmstand beside the phone.
- It contains:
  - Safety forms, etc. filed alphabetically by child's first name.
  - Highlighted contact phone #s and any scary allergies or health conditions.
  - Daily check-in and check-out forms, students listed alpha by first name.

### **Student Medications**

- Daily meds stored in kitchen or in house fridge. Keep Epi-pens (if applicable) with adult who's with that child.

### **First-Aid Kit**

- In washroom, where staff can easily reach it.
- Contains benadryl, bandages, bandaids, tweezers, disinfectant, plastic gloves, etc.

### **Poison Ivy Soap**

- In washroom, where staff can easily reach it.

### **Nametags**

- Kids make own on first day - laminate, punch hole, pin-on.
- Worn daily by students and teachers. Farm staff nametags worn daily too.

### **Lunch Blankets**

- use blankets for picnic lunches, store in farmstand (for easy access)



# 10. PROGRAM SUPPLIES:

## Kitchen Items for Food Preparation and Snack:

- Reusable plastic cups for snack (with child's name on them)
- Reusable plates and utensils.
- Paper towels (only used occasionally)
- Water source (if no sink available)
- Dish pans, drainers, dish soap and sponges. (Children helped clean up snack)
- Blankets or sheets for sitting on
- Clothesline to hang blankets if washed
- Pitchers for beverages
- Ice cubes to chill beverages as needed
- Food besides the things we prepared:
  - Frozen organic juice and lemonade concentrate
  - Seed and fruit trail mix (sunflower seeds, nuts, raisins, etc.)
  - Raisins
  - Crackers
- Hand-cranked grain mill
- Hand-turned egg-beaters (not electric)
- Garlic press
- Pastry blender
- Chopping gizmo (self-contained, like those used for chopping nuts)
- Butter knives (average not-so-sharp table knives)
- Potato mashers
- Graters, especially the 4-sided ones that stand upright on their own
- Measuring cups
- Measuring spoons
- Mixing bowls of plastic or metal (large, medium, small)
- Mixing spoons, whisks
- Additional plastic or metal bowls
- Cutting boards and plastic plates (the more the better)
- Sharp knives (one or two, for adults only!)
- Timer (essential!)

## Supplies to Make:

- Compost Bins - with 7 pallets
- "Noah's Ark" cards - (3-4 of each kind, laminated)
- Plant Part Food cards (*cut pictures of crops from seed catalogs, minimum of 2 ea, laminated*)
- Shaded structure for greenhouse thermometer
- Compost skit costumes (*see compost skit for descriptions and ideas*)
- Pollen collectors
  - duct tape dark velvet/corduroy cloth onto cardboard or thin plywood
  - size can vary, but important to consider ease of holding with one hand
- Garden Spirit basics (*enough for one scarecrow for each child*)
- Journals (*bound with spiral, stapled with construction paper cover, or stapled with just paper*)
- Popsicle Stick Spacers and Diggers (*use for measuring depth and spacing*)
  - mark sticks at 1" intervals, use waterproof markers
  - write names on them (so students can keep track of their own tools)
- Popsicle Stick Plant Markers
- Insect Collecting Boxes (*use for collecting insects in the field*)
  - boxes with large baggie taped to one edge
  - write names on them (so students can keep track of own tools)



## **Supplies to Buy, Scrounge, Collect:**

Spray (mist) bottles (*cooling off kids, watering seedlings*)

Watering cans

Sprinkler

Trowels

Spades

Hammers (*Child-sized, and other sizes*)

Nails

Weeding hand tools

Soil block makers (Large and Mini-blocker)

Single cell seedling containers, six-pack seedling containers, plant pots

Popsicle sticks (*labeling seedlings, transplant spacers, digging tools*)

Wood scraps (*garden spirits, looms, etc.*)

Safety glasses

Work gloves (*cloth-type, for construction or gardening*)

Plastic gloves (*non-latex or latex, for chemical testing*)

Alum (*for soil shakes*)

Soil test kit materials

Compost thermometer

Indoor/Outdoor thermometer w/ Maximum and Minimum Temps (digital)

Garden cart and/or wheelbarrow

Seven pallets (*compost bins*)

String and stakes (*several pairs of stakes with string tied between each pair*)

Hand lenses

Clipboards

Test tubes

Small bottles and jars with lids

Large jars (*commercial size - 1-2 gallon*)

Buckets

Yardsticks & rulers

Pens, pencils, markers, crayons

Scissors

Stapler

Elastics, rubber bands

String, twine, rope

Paper clips, large clips

Clothespins

Hole punch

Tents or Tarps (*for shade or shelter from light precipitation*)

Poly-spots (*rubber spots, defines circle area, good for games, etc.*)

Tables or picnic tables (*for doing projects, preparing food, serving snack, etc.*)

Film for cameras



## 11. RECIPES:

*One of the best things about Adventures in Agriculture is preparing food from scratch. We marvel at the appetites generated after spending part of a morning outdoors. These are the recipes we used this year, but if your child claims that your rendition of them "isn't the same as what we made at the farm", have them do vigorous outdoor chores or games before they eat. It works wonders.*

### "Compost"

A compost pile is layered, using browns like hay (carbon), water, soil, and greens like plant waste (nitrogen). We made a "compost" snack by layering various foods in our bowls and connecting it to the process of composting.

Yogurt, plain or vanilla

Granola

Fresh berries (strawberries, raspberries, or blueberries), in pieces, sliced, or mashed.

Sunflower seeds

Raisins

Coconut

Sesame seeds

Maple syrup or Honey

Whatever else you think would be tasty.

Layer the ingredients in a bowl in your preferred order. Use a spoon to turn the compost right into your mouth! Yum!

### Muffins

1 egg, beaten

1/2 cup milk

1/2 cup (or less) honey, sugar, maple syrup

1/4 cup vegetable oil

1-1/2 cups flour (some freshly ground!)

2 tsp. baking soda

1/2 tsp. salt

1/2 cup fresh berries or other fruit pieces

Mix the wet ingredients in one bowl. Mix the dry ingredients in another bowl. Add the dry ingredients to the wet, mixing only just until the flour is moistened. Add fruit and mix gently. Fill buttered muffin tins about 2/3 or 3/4 full. Bake 400 degrees for 20-25 minutes, or until done.

### Garlic Bread

French or Italian bread, or similar loaf (*we got ours from Sweet Dreams bakery in Stratham*)

1/4 cup butter, softened

2-3 medium cloves garlic or a bunch of garlic tops (use more or less, to taste)

Slice the bread in half lengthwise, leaving a top and a bottom half. Peel the garlic clove and squeeze in a garlic press, or chop the garlic tops finely. Combine with butter. (Add herbs, salt, pepper if desired. We didn't.) Spread garlic butter onto the cut face of the bread. Place on cookie sheet face up. Bake in 350 - 400 degree oven (or broil if desired) until butter has melted and bread is slightly browned (but not too much!).

### Vegetables and Dip

Freshly harvested produce, washed and sliced if necessary

(We used: carrots, summer squash, cucumber, zucchini, green beans, tomatoes)

Dipping sauce, such as ranch dressing, italian dressing or homemade vinaigrette.

Choose your favorite vegetables (these or others) and dip them into the sauce.

### Oven Fried New Potatoes

Slice freshly-harvested, washed, unpeeled new potatoes into french fry strips. Toss with salt and vegetable oil. Bake at 400 degrees or broil until done, turning potatoes during cooking as needed.

(We used a variety called Red Norlands.) Serve with ketchup, salt or vinegar.



### Carrot Cake

2 cups flour  
1 tsp. baking powder  
1 tsp. baking soda  
1 tsp. salt  
1 tsp. cinnamon

2 cups sugar/honey/maple syrup  
3 cups grated carrot  
1 cup oil  
4 eggs

Combine dry ingredients. Add wet ingredients, beating until combined. Beat for 2 mins, med. speed. Bake at 325 degrees in buttered 13x9x2" pan (50-60 min) or 9x1.5" cake pans (40 min) or muffin tins for "carrot cupcakes" (about 20 min). Cool 10 minutes in pan. Remove from pan, cool. Frost with cream cheese frosting.

### Chips and Salsa

10 c. chopped ripe tomatoes (abt. 6 lbs)  
5 c. seeded, chopped bell peppers (abt. 2 lbs)  
5 c. chopped onion (abt. 1-1/2 lbs)  
2-1/2 c. seeded, chopped hot peppers  
(abt. 1 lb) (optional) *We omitted this.*  
juice of 5 or 6 limes

3 or more cloves garlic, minced  
2 Tbsp. cilantro  
2 Tbsp. parsley  
3 tsp. salt  
1 tsp. hot pepper sauce (optional)  
*We omitted this.*

Combine all ingredients in a large bowl. Mix and let sit for a few minutes so flavors can mingle. Eat fresh with lots of tortilla chips.

*The salsa is easily modified. Add chopped tomatillos, corn, beans, smoked garlic or smoked peppers, sun-dried tomatoes for variety. Add tomato paste for a thicker salsa. Use cider vinegar instead of lime juice. Etc...*

### Chocolate Zucchini Cake

2 1/2 cups flour  
1/2 cup cocoa  
2 1/2 tsp. baking powder  
1/2 tsp. baking soda  
1 tsp. salt  
1 tsp. cinnamon (optional)  
3/4 cup vegetable oil (or butter, softened)

3 eggs  
2 cups sugar or honey  
2 tsp. vanilla  
1/2 cup milk or yogurt  
2 cups grated zucchini  
1/2 cup chopped nuts (optional)  
1/4 cup chocolate chips

Combine dry ingredients. Cream butter (or oil) with sweetener. Add eggs one at a time. Stir in vanilla, milk and zucchini. Add chopped nuts. Pour into buttered bundt or angel cake or sheet cake pan. Sprinkle chocolate chips on top. Bake at 350 degrees for 1 hour, or until done.

### Edible Weed Salad Bar

Freshly harvested and washed edible weeds! (These greens are best if young and tender)

Other vegetables, as desired

Vinaigrette salad dressing (or other dressing)

(We used: purslane, lamb's quarters, amaranth (a.k.a. pigweed), red clover, and a variety of other treats, including grated carrot, chopped cucumber, borage flowers and calendula petals.)

Prepare greens and other vegetables. Assemble salad and dress with vinaigrette.

### Whole Grain Bread

2 cups warm water  
1 Tbsp. yeast  
1 Tbsp. sugar or honey  
1 Tbsp. salt  
6-7 cups freshly ground flour & unbleached white flour (We used a mixture of wheat, spelt, and rye flours)

Sprinkle yeast and sugar over warm water. When foaming well, add about 5 cups flour and salt. Stir and then knead well. Form into a ball and put in oiled bowl. Let rise, covered, until doubled. Punch down, let rise again. Shape into loaves. Let rise again. Bake in buttered bread pans 350 degrees until done. Butter tops of loaves as they come out of oven. Serve with butter and almond butter, or use as the shortcake in strawberry shortcake.



### Individual Ice Cream

1/2 cup whole milk (Add 1 pint half and half per gallon of milk to hasten freezing.)  
1 Tbsp. sugar or maple syrup  
1/2 tsp. vanilla

about 1 Tbsp. of mashed fruit (optional)  
ice (18-20 cubes per serving)  
1 Tbsp. salt

Add sugar and vanilla to a small ziplock bag. Pour in milk. Add fruit if desired. Squeeze out as much of air as possible. Seal properly. Put small bag into a larger ziplock bag. Add salt and ice to large bag. Squeeze out as much air as possible. Seal properly. Knead the bags until the ice cream forms, usually 5-10 minutes, depending on the outside air temperature. After the ice cream forms you can cut a corner of the bag off and squeeze it into cones, or just open the top and eat with a spoon. If it takes too long to thicken into ice cream, stick it in the freezer for a while! (We had varying success with this method. You also could use a hand cranked freezer.)

### Biscuits

4 cups flour  
4 tsp. Bakewell Cream (or cream of tartar)  
2 tsp. baking soda

1 tsp. salt  
1/2 cup butter  
1+1/2 cups cold milk

Combine dry ingredients. Cut in butter (or other shortening) with knives or pastry blender. Add milk all at once. Stir quickly with fork. Knead 5-6 times on floured board, roll out until about 1/2" thick. Cut with biscuit cutter (or cookie cutters). Put on baking sheet (ungreased) and bake at 475 degrees 5 minutes. Turn off oven and leave in for 5-10 minutes until golden browned on top. Serve with honey and butter or serve as strawberry shortcake with whipped cream and berries.

### Goat's Milk Ricotta Cheese

goat's milk  
butter

1/4 cup cider vinegar  
baking powder

Scald the milk (bring it slowly to a boil over medium high heat, stirring constantly)  
Add 1/4 cup cider vinegar, to cause curds and whey to separate  
Pour through a fine cloth strainer. Add butter and baking powder.  
Spread on crackers, toast, etc.

### Corn Bread

*We ground corn kernels into cornmeal and wheat & spelt into flour using a hand-cranked grain mill.*

1 cup flour  
1 cup cornmeal  
1/4 cup honey, maple syrup or sugar  
4 tsp. baking powder

3/4 tsp. salt  
2 eggs  
1 cup milk  
1/4 cup oil

Combine dry ingredients. Stir together eggs, milk and oil. Add to dry ingredients. Beat until smooth. Pour into buttered 9x9x2" pan. Bake at 425 degrees for 20-25 minutes, or until done. (For cornsticks, bake at 425 degrees for 12-15 minutes.) Serve with honey and butter.

### Strawberry Shortcake

strawberries (or other fruit in season)  
heavy cream  
sweetener (syrup, honey, etc.)  
vanilla  
cake (biscuits, scones, whole-grain bread, etc.)

Mash the berries into a sauce-like consistency, Whip the cream with sweetener and vanilla to taste. Serve on cake, biscuits, scones, whole grain bread.



### **Fresh Fruit, mostly unadorned**

Fresh fruit in season (strawberries, raspberries, blueberries, peaches, muskmelon, watermelon...)

Wash, prepare, serve, enjoy!

### **Red Clover Tea**

- red clover blossoms

- water

Let steep in sun until flavors emerges. Cool with ice. Add honey as desired. Drink straight or mix with lemonade or fruit juice.

### **Sumac Tea**

- Staghorn sumac berries

- water

Let steep in sun until flavors emerges. Cool with ice. Add honey as desired. Drink straight or mix with lemonade or fruit juice.



## 12. DAILY SCHEDULE:

A given day was divided into separate learning times. Below is a general schedule, which factors in an extra-long time for regular activities such as chores. Ideally, chores would be accomplished in less time. Also, we found it helpful to give the campers some down time after lunch, for playing their own games

A given day at Adventures in Agriculture is divided into separate learning times. Below is a general schedule, which varied with each program and each day, depending on the needs of the staff and the campers. Sometimes the activity carries over from pre-yowza to post-yowza, and sometimes chores took almost the entire pre-yowza time.

**8:30 Arrival Time** (An informal open-ended few minutes from 8:30 am until everyone has arrived. Children put lunches and belongings away, visit with animals, help prepare materials for the day's activities.)

Begin open-ended activities at gathering area. (e.g. grinding grain, cleaning fleece, mixing soil, watering plants)

**Opening Circle** (A brief gathering-together to greet each other, sing songs, introduce the day.)

**8:40 Chore Time** (In small groups, students attend to animal and plant care, weather and compost observation.)

**8:45 Chore Time** (In smaller groups, campers attend to animal care and weather observation.)

*Mill Valley Chores:*

Chick care	Clean coop, add fresh shavings, fill water & grain,
Hen care	Clean coop, open gate to outdoors, fill water & grain, give greens (weeds), collect eggs.
Rooster care	Move chicken tractor, fill water and grain.
Rabbit care	Fill water and grain, give greens (hay-grass-parsley-carrot tops)
Goat care	Fill water bucket, give grain allotment, fill hay rack, give greens (weeds, grass, etc.)
Sheep care	Fill water bucket, give grain allotment, fill hay rack, give greens (weeds, grass, etc.)
Weather	Check and record rain gauge, high-low-current temps, barometer, wind, general conds.
Compost	Check and record temperatures, turn if necessary.
Greenhouse	Check seedlings, water plants and seedlings, start drip hose for tomatoes.

**9:30 (or sooner) Activity Time** (Time for directed learning.)

**Introduction to the topic**  
**Lesson/Activity**

**10:15 Yowza** (Snack break, often synchronous with the farm crew's break. Children help prepare, set-up, clean-up.)

**10:45 Activity Time** (Time for directed learning.)

**Introduction (if new topic)**

**Lesson/Activity**

**12:00 Lunchtime** (Lunch break, usually synchronous with the farm crew's lunch break. Students can informally report on their activities to farmer and farm crew. Meals are eaten picnic style.)

**Journal Time** (Children spend some quiet time after lunch with their journals.

When finished, they put away supplies, gather belongings and have down time before our wrap-up.)

After lunch, campers directed their own play, with games like sharks & minnows or capture the flag. Staffers occasionally joined in.)

**12:45 Wrap-up Time** (Review of the day, a game related to the activities, followed by a brief closing circle.)

**1:00 Departure Time** (Children are picked up, "checking out" with a designated staff person.)



## **13. SAMPLE CURRICULUM SEQUENCES:**

*Each session of Adventures in Agriculture was a refinement of our program. We added new things to our curriculum and eliminated others, balancing our needs as director, staff, and farmers with the needs (as we perceived them) of the children and their families. These are some rough guidelines of what we did each day in some of the sessions. Most of the activities are outlined earlier in this document, but it was our teaching style to improvise in the moment, diverging from our initial daily curriculum plan, and many of those minor improvisations weren't recorded.*

*Most sessions were 2 weeks long, but two sessions in 2002 were only one week. Unless otherwise indicated, the children were at the farm from 8:30-1:00 pm. On every day of every session, the children observed the weather, did animal and greenhouse chores, made snack, and wrote in their journals. These notes give a general sense of the other things we did, but aren't wholly accurate reflections of what actually went on during each day. Consider them just a few of the highlights of Adventures in Agriculture.*

### **2000 Session One (gr.1-5):**

M - DAY 1: Orientation, Opening circle, Tour of buildings, Hayride tour of fields, Collect materials for compost, Do compost "play", build compost  
T - DAY 2: Introduction to barn and greenhouse chores, collect eggs  
W - DAY 3: Soil, Seed planting and transplanting with farm crew  
Th - DAY 4: Parts of a Plant, Seeds, Starting Seeds  
F - DAY 5: Direct Seeding  
M - DAY 6: Cover Crops, Blindfolded Garden Walk  
T - DAY 7: Weather, Harvesting Crops  
W - DAY 8: Harvest crops with farm crew for CSA distribution  
Th - DAY 9: Transplanting, Weeds, Mulch  
F - DAY 10: Garden Spirit construction and completion, Closure Activities, "Farmer's Choice"

### **2000 Session Two (gr.1-5):**

M - DAY 1: Orientation, Opening circle, Tour of buildings, Hayride tour of fields, Collect materials for compost, Do compost "play", build compost, Review layering process on chart paper, Lunch, Closing circle  
T - DAY 2: Introduction to barn and greenhouse chores, collect eggs  
W - DAY 3: Introduce soils, collect soil from fields, soil shakes, paint with soil, sift soil, journals, Big Wind Blows  
Th - DAY 4: Parts of a Plant, Seeds, Start Seeds  
F - DAY 5: Direct Seeding in field  
M - DAY 6: Cover Crops, Blindfolded Garden Walk  
T - DAY 7: Weather, Harvest Crops  
W - DAY 8: Harvest garlic with farm crew  
Th - DAY 9: Weed and Mulch asparagus, weed corn, snack, Beekeeper talk and demos, Pollination Simulation, games  
F - DAY 10: Closure Activities, "Farmer's Choice"

### **2001 Session One (gr.1-5):**

M - DAY 1: Arrival activities, nametags, review of expectations, hayride tour of fields, introduce chores, tour buildings, journal, Big Wind Blows  
T - DAY 2: Name game, farming through the seasons activity, introduce compost, dramatize compost, make compost heap,  
W-F - DAY 3-5: Missing data, probably made garden spirits among other things.  
M - DAY 6: Inspect seed flats with magnifying glasses looking for growth, introduce soils, percolation simulation, collect soils, test pH, make soil shakes, make soil ribbons.  
T - DAY 7: Plant part games, grind grain, collect tomato hornworms, make soil blocks, prepare



barn for arrival of chicks, make soil blocks in greenhouse (Raining!)

W - DAY 8: Look at plant structures, harvest, introduce weeds, experiment with weed control methods and tools (hand, mulch, wheel hoe, hoes.)

Th - DAY 9: Make goat cheese (older kids), grind grains, introduce insects (beneficials and pests), collect insect pests for chickens, play pollination simulation game.

F - DAY 10: Graph weather data, examine plants, fabulous farmer certificates, collect scarecrows from fields, planting relay race.

### **2001 Session Two (gr.1-5):**

M - DAY 1: Arrival, nametags, verbal review of expectations, introduce seed germination, seed planting, tours of fields and buildings, introduction activities, seed experiments.

T - DAY 2: Introduce compost, read book on soil, make compost jars (recording ingredients and process), 4 groups, 1 job each: (harvest garlic, collect potato beetles, hand weed onions, mulch asparagus,) introduce journals, squeeze circle

W - DAY 3: Bunch garlic for drying, harvest rye, grind grain into flour, examine seed experiments, introduce garden spirits, 4 groups, 1 job each: (mulch flowers & explore under existing mulch, collect tomato hornworms in hoop houses, collect weeds in CSA herb garden, mulch asparagus,) soil block making, choose names for chore groups.

Th - DAY 4: Make garden spirits, install in fields, monitor plant experiments.

F - DAY 5: Collect flower samples, Monitor plant experiments, 4 groups, 1 job each: (harvest garlic, collect potato beetles, collect weeds in CSA garden, mulch asparagus or flowers,)

M - DAY 6: Harvest salsa ingredients, compare germination rates of seed experiments, 4 groups, 1 job each: (harvest garlic, collect bean beetles, use wheel hoe in fallow area of field, mulch asparagus or flowers,)

T - DAY 7: Harvest blueberries for muffins, make large soil blocks, transplant lettuce seedlings

W - DAY 8: Demonstration of disking a field with tractor, seed buckwheat, harvest garlic to take home, roll hay bales over to herbs, collect japanese beetles, harvest potatoes, hay bale rolling relay

Th - DAY 9: Water games, field work, monitor plant experiments, flame weeding demo.

F - DAY 10: Collect garden spirits, dig through compost to see if changed, fabulous farmer certificates, closure activities, farmer's choice.

### **2001 Session Three (gr.4-7) (9:30 am - 3:30 pm):**

M - DAY 1: Introductory activities, nametags, overview of expectations, tours of fields and buildings, hayride, harvest blueberries, read seed book, seed identification activity, journal intro.

T - DAY 2: Farming through the seasons activity, seed germination tests, introduce soil, mix soil with cement mixer, make soil blocks, plant seeds in soil blocks

W - DAY 3: Wheel hoe, plant seeds in 6-paks for experiments, mulch flowers

Th - DAY 4: Chicken coop maintenance, grind cornmeal, construct garden spirits

F - DAY 5: Corn bread, rototilling demonstration, transplant brassicas in field, set up irrigation, stain lumber for chicken tractor, install some garden spirits

M - DAY 6: Install remaining garden spirits, greenhouse work (turn compost, make soil mix, make soil blocks), collect soil for tests, harvest vegetables.

T - DAY 7: Harvest potatoes, demonstration of combine (for rye seeds), plant in fields, Introduce weeds, mulch herbs (self-directed mowing begins.)

W - DAY 8: Discuss weed control methods and test different ones, flame weeding demonstration, chicken tractors, harvest rye and grind into flour, harvest weeds for goats (self-directed mowing and raking really gets under way.)

Th - DAY 9: Chicken tractor construction, set up irrigation, collect soil samples, harvest onions

F - DAY 10: Chicken tractor, soil ribbons, soil shakes, compost turner demonstration, farmer's choice, fabulous farmer certificates.

### **2002 Session One (gr. K-2):**

M - DAY 1: Introduction activities, make nametags, review expectations, tour buildings, tour fields, introduce chores, collect insects for observation, make wormeries in large jars (for obs.)



T - DAY 2: Goat greeting, Farmer David had a Farm, harvest and prepare vegetables for snack, field trip to pond, harvest garlic for Wed., Big Wind Blows.

W - DAY 3: Plant part card match activity, song, greeting, collect weaving materials, start weaving, grind grain (corn, wheat, spelt), play on hay bales, start compost.

Th - DAY 4: Weaving, plant part memory, corn bread, seed song, seed mosaics, seed planting (to take home), bread making for Fri., compost turning, leaf/flower pounding.

F - DAY 5: Pick strawberries for snack, grind grain to take home, felting with colored fleece, self portrait at the farm, fabulous farmer certificates.

### **2002 Session Two (gr. 1-5):**

M - DAY 1: Introduction activities, review expectations, tour buildings, tour fields, collect potato beetles and weeds for hens, mix potting soil, plant seeds.

T - DAY 2: Introduce weather chart, harvest garlic for garlic bread,

W - DAY 3: Grind spelt and cornmeal for cornbread, pollination simulation game, mix potting soil, transplant tomato seedlings into larger containers.

Th - DAY 4: Grind grain for bread, harvest vegetables for vegetables and dip, second trial of pollination simulation, cut saplings/branches for flags,

F - DAY 5: Transplant tomatoes, harvest strawberries for strawberry shortcake (with bread), collect potato beetles, collect weeds and wildflowers for Flower Pounding (for flags)

M - DAY 6: Compost snack, turn compost, construct & install large loom

T - DAY 7: Grind grain for biscuits, begin weaving large loom, collect insects

W - DAY 8: Make own loom, weave on large loom, felting a ball, make chocolate zucchini cake.

Th - DAY 9: Compost dramatization,

F - DAY 10: Sheep shearing demonstration

### **2002 Session Three (gr. 4-6):**

M - DAY 1: Introduction Activities, review of expectations, walking tour of buildings, tour of fields on golf cart and trailer, harvest blueberries, yowza, chores

T - DAY 2: Introduce Plant Parts, collect crop for each plant part, Harvest & prepare garlic bulbs and scapes for market and for garlic bread, clean fleece, wash fleece, make felted balls.

W - DAY 3: Grind cornmeal for cornbread, tear apart old ramp (intro tools, etc.)

Th - DAY 4: Harvest vegetables for vegetables and dip, construct ramp, felt a vessel.

F - DAY 5: Make chocolate zucchini cake, tease and card fleece, collect japanese beetles, finish felting vessel, mow weeds, feed goats & sheep.

### **2002 Session Four (gr. 1-5):**

M - DAY 1: Introduction Activities, review of expectations, Introduce Plant Parts, tour of buildings and fields, Chores

T - DAY 2: Harvest garlic for garlic bread, plant seeds, gather weeds, collect potato beetles.

W - DAY 3: Harvest garlic (each take one home)

Th - DAY 4: Chocolate zucchini cake, wash fleece, harvest rye, grind grain, make bread for Fri.

F - DAY 5: Felt balls, turn compost, transplant tomatoes to field

M - DAY 6: Transplant tomatoes to field, weed tool trials, edible weed collection

T - DAY 7: Dig potatoes for home fries, construct looms, begin weavings.

W - DAY 8: Harvest blueberries for muffins, collect rye seed

Th - DAY 9: Harvest tomatoes and peppers for salsa, Andy Goldsworthy-inspired Sculptures, Felting Vessels

F - DAY 10: Harvest carrots for carrot cupcakes, Fabulous Farmer Certificates, finish sculptures, play games, sing songs, Farmer's Choice.



# 14. RESOURCES:

## BOOKS:

- Andy Goldsworthy: A Collaboration with Nature by Andy Goldsworthy (Harry N. Abrams, 1990).  
Also by Andy Goldsworthy: Stone (1994), Wood (1996), and Time (2000).
- The Art of Feltmaking by Anne Einset Vickrey (Watson-Guptill Publ., NY, 1997).
- A Seed Grows: My First Look at a Plant's Life Cycle by Pamela Hickman & Heather Collins (Kids Can Press, 1997).
- Botany For All Ages by Jorie Hunken (The Globe Pequot Press, 1989).
- The Children's Kitchen Garden by Georgeanne & Ethel Brennan (Ten Speed Press, 1997).
- The Cooperative Sports and Games Book: Challenge Without Competition by Terry Orlick (Pantheon Books, 1978).
- Digging Deeper: Integrating Youth Gardens into Schools and Communities by Joseph Kiefer and Martin Kemple (Common Roots Press, 1998). (*Annotated appendix of resources.*)
- The Eyewitness Visual Dictionary of Plants (Dorling Kindersley Ltd., 1992).
- From A to Z in Sustainable Agriculture: A Curriculum Directory for Grades K-12. by the UVM Center for Sustainable Agriculture (University of Vermont)
- The Gardener's Bug Book: Earth Safe Insect Control by Barbara Pleasant - a revised edition of The Bug Book by Helen & John Philbrick (Storey Communications, 1994).
- Gardening with Children by Beth Richardson (The Taunton Press, 1998).
- Gardening Wizardry for Kids by L. Patricia Kite (Barron's Educational Series, 1995).
- The Growing Classroom: Garden Based Science by G. Appel and R. Jaffe (Addison Wesley Publishing Company, 1990)
- Hey Kids! You're Cookin' Now!: A Global Awareness Cooking Adventure by Dianne Pratt (Harvest Hill Press, 1988).
- Inch by Inch: The Garden Song by David Mallett (Harper Collins, 1995). (*Book based on song.*)
- Is It Poison Ivy? by Joan Raysor Darlington (Oyster River Press, 1999).
- The Insect Workbook by Anna Leahy (The Entomological Society of America, 1994).
- Looking at Plants by David Suzuki (Warner Books, 1985).
- The Morning Meeting Book by Roxann Kriete with Lynn Bechtel (Northeast Foundation for Children, Greenfield, MA, 2002).
- The Nature Company Discoveries Library: Weather ed. by David Ellyard (Time Life Books, 1996).
- Nature Smart: A Family Guide to Nature by Stan Tekiela & Karen Shanberg (Adventure Pub, 1995).
- Peterson First Guides: Insects by Christopher Leahy (Houghton Mifflin, 1987).
- Play With Your Food by Joost Elffer's (Stewart, Tabori & Chang, 1997).



Peterson First Guides: Insects by Christopher Leahy (Houghton Mifflin, 1987).

Play With Your Food by Joost Elffers (Stewart, Tabori & Chang, 1997).

Practical Horticulture by LW Rice and RP Rice (Prentice Hall, 1996). *Ch. 5 covers Soils and Fertility.*

Pretend Soup and Other Real Recipes: A Cookbook for Preschoolers & Up by Mollie Katzen and Ann Henderson (Tricycle Press, 1994).

The Reason for a Flower by Ruth Heller (Grosset & Dunlap, 1983).

Scarecrows by Avon Neal and Ann Parker (Barre Publishing, 1978).

The Victory Garden Alphabet Book by Jerry Pallotta & Bob Thomson, illustrated by Edgar Stewart (Charlesbridge Publishing, 1992).

The Victory Garden Kids' Book: A Beginner's Guide to Growing Vegetables, Fruits and Flowers by Marjorie Waters (Houghton Mifflin, 1988).

The Weather Sky by Bruce McMillan (Farrar, Strauss & Giroux, 1991).

Worms Eat My Garbage by Mary Appelhof (Flower Press, 1997).

Worms Eat Our Garbage (Teacher Resource) by Mary Appelhof, Mary Frances Fenton & Barbara Loss Harris (Flower Press, 1993).

## **ORGANIZATIONS:**

### **The Farm School**

Sentinel Elm Farm, 488 Moore Hill Road, Athol, MA 01331  
(978) 249-9944      [www.farmschool.org](http://www.farmschool.org)

### **Food Works and Common Roots Press**

64 Main Street, Montpelier, VT 05602  
(802) 223-1515      [rootsnet@plainfield.bypass.com](mailto:rootsnet@plainfield.bypass.com)

### **The Morris Farm Trust**

PO Box 136 (156 Gardiner Road), Wiscasset, ME 04578  
(207) 882-4080      [www.morrisfarm.org](http://www.morrisfarm.org)

### **Project Food, Land & People**

1990 N. Alma School Road, #136, Chandler, AZ 85224  
(602) 963-7959

### **Shelburne Farms**

1611 Harbor Road, Shelburne, VT 05482  
(802) 985-8686      [www.shelburnefarms.org](http://www.shelburnefarms.org)

### **Stonewall Farm**

242 Chesterfield Road, Keene, NH 03857  
(603) 357-7278      [www.stonewallfarm.org](http://www.stonewallfarm.org)



## 15. FORMS AND LETTERS:

*Dear Reader,*

*Thank you for using this document to support your own on-farm education programs. Sharing resources is valuable for both farmers and teachers, and we found our own collaborations with agriculture education colleagues to be essential for planning, preparing and implementing our programs. May there be seeds of usefulness here for you.*

*Following this final page are a number of examples of forms we created and letters we wrote. Some were for our records, others were for generating publicity, still others were for parents and families to keep. They are offered, with some annotation, as samples to inspire your own mountains of paperwork to support your agriculture education programs. Enjoy them with warm wishes for many splendid adventures in agriculture with children on small-scale farms.*

*Sincerely,*

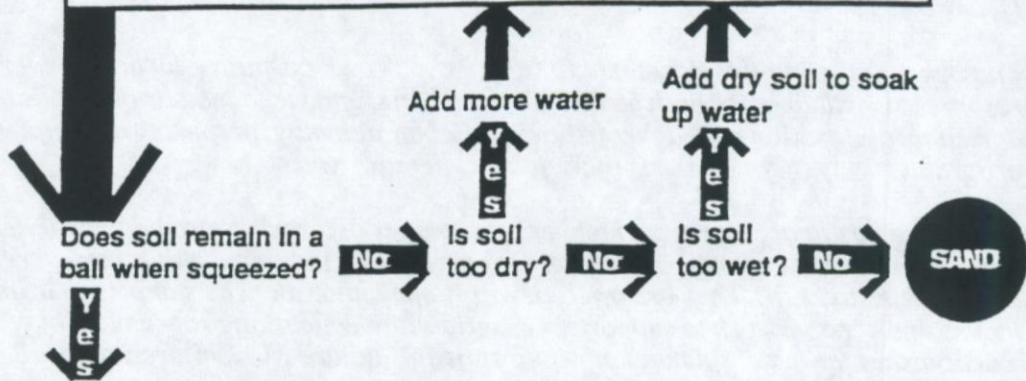
*Christine H. Fowler  
North Twin Education Programs  
August 2003*



# SOIL TEXTURE BY FEEL

## START

Place about 2 tsp. of soil in your palm. Add water drop by drop and knead the soil until a smooth and plastic consistency is obtained. The soil should now be moldable like a moist putty.



Place ball of soil between thumb and forefinger, gently pushing the soil forward with your thumb, squeezing it upward into a ribbon. Try to keep the ribbon of uniform thickness and width. As the ribbon forms, allow it to drape over the forefinger until it breaks from its own weight. Does the soil form a ribbon?

**LOAMY SAND**



What kind of ribbon does the soil form?

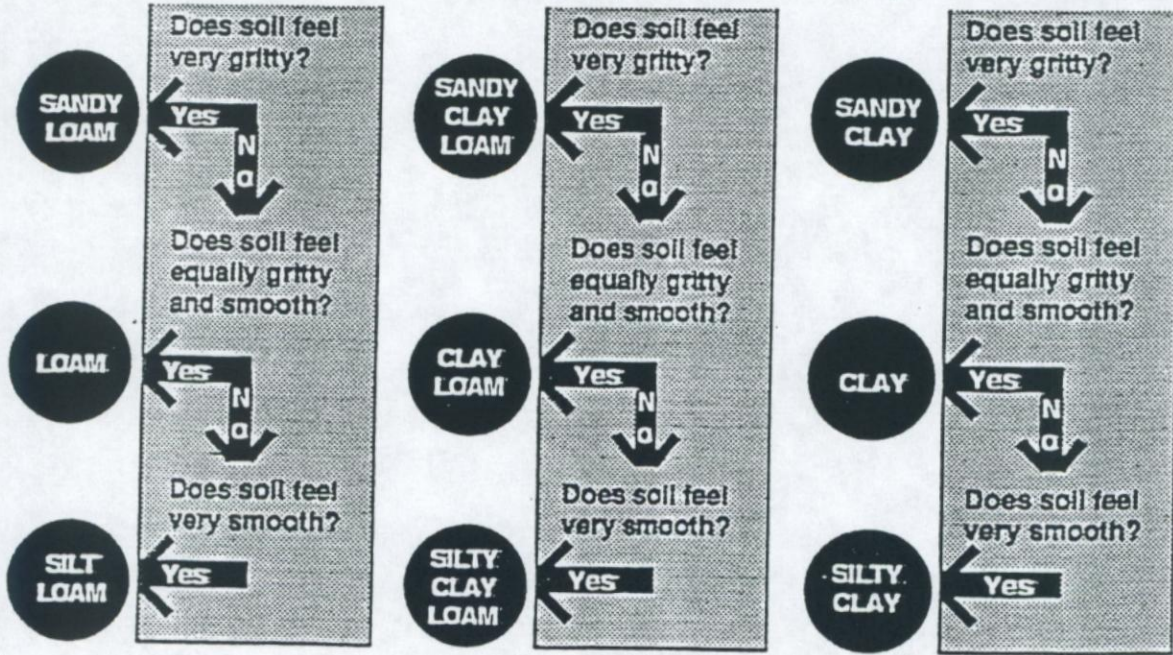
Forms a weak ribbon, less than 1" (2.5 cm) before breaking.  
**LOAM**

Forms a medium ribbon 1-2" (2.5-5 cm) before breaking.  
**CLAY LOAM**

Forms a strong ribbon 2" (5 cm) or longer before breaking.  
**CLAY**

Take a small pinch of the ribbon in your palm and make a slurry of the soil with additional water

HI  
↑  
% SAND  
↓  
LO



← % CLAY →



Educational Experiences  
in Organic Farming

Adventures  
in  
Agriculture



A Science Day Camp  
for girls & boys entering grades 1-5

Session 1: July 10-21, 2000  
Session 2: July 24-Aug 4, 2000

Monday - Friday  
8:30 am - 1:00 pm

Partial funding for development of Adventures in Agriculture was provided by a grant from the **USDA Sustainable Agriculture Research and Education (SARE) Program.**

What is Adventures in Agriculture?



This special program at Mill Valley Farm provides an opportunity for girls and boys to explore some fundamentals of sustainable agriculture during a two-week day camp in the healthy environment of an organic farm.

What Do Students Learn?

Educational experiences at Mill Valley Farm will help students answer questions including:

- Where does our food come from?
- What do farmers do on their farms?
- What keeps plants and soil healthy?
- What does a plant need to grow?
- How is food grown organically?
- What do *organic* and *sustainable* mean?



How Do Students Learn?

At Mill Valley Farm, we offer authentic learning experiences:

- In **small groups**, with individual attention.
- by using **scientific methods** of observation and experimentation.



- through **hands-on** projects and **experiential** activities. (Roll up your sleeves!)



- from **direct experience**, with nature as a teacher and the farm as the classroom.



- by participating in **age-appropriate activities, experiments and field studies** in various life science disciplines, including Botany, Entomology, Ecology, and Horticulture.

What Will Students Do?

- Spend two weeks outdoors in the wholesome environment of an organic farm.
- Learn first-hand how a family farm works.
- Interact with the friendly farm animals.
- Experiment with soils, seeds, plants, insects, crops & more...
- Have fun!



PUBLICITY/MKTG  
2000 Brochure p1



Adventures in Agriculture  
at Mill Valley Farm  
c/o North Twin Education Programs  
259 Wadleigh Falls Road  
Newmarket, NH 03857

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Adventures in Agriculture  
is a two-week Science day camp  
providing educational experiences  
in sustainable agriculture  
for girls and boys  
enrollment numbers 1-5



### Who Is It For?

Girls and boys entering grades 1-5 may attend. Enrollment is limited to ensure a low student:teacher ratio.



### When is It?

Adventures In Agriculture offers two sessions, each running for two weeks, Monday-Friday.

**Session 1:** July 10-14 & July 17-21

**Session 2:** July 24-28 & July 31-Aug 4

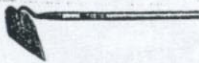
Adventures in Agriculture meets daily 8:30 am - 1:00 pm. Morning lessons and activities are followed by lunch. (Campers bring their own lunches.)

### Where Is It?



Adventures In Agriculture will be held in the fields, woods, greenhouses and buildings on the Mill Valley Farm property, in the fertile Winnicutt River Valley of Stratham, NH.

### What are the Fees?



Tuition for the two week session is \$225. (\$190 for CSA/Mill Valley Farm members.) Fees include all supplies, daily snacks, and a Mill Valley Farm membership for students and their families. (Farm members enjoy farm stand discounts and other benefits.)

Registration confirmation will be sent upon our receipt of your \$25 deposit. **The tuition balance is due by June 1.**

### Who are the Teachers?



**Christine Fowler** lives in Newmarket, and was raised on organic gardening and education in Millinocket, ME. She earned her BA at Bryn Mawr College and MEd at UNH, and has taught fourth grade, kindergarten and her own classes as an independent educator. Chrissy is one of the founding members of the Mill Valley Farm CSA, and if she could be one vegetable at the farm, she would be a Brandywine tomato.

**Lucie Garnett** teaches first grade at New City School in her hometown of St. Louis, MO. Lucie earned her BA at Bowdoin College and her MEd at Lesley College. Her NH roots come from a lifetime of summers in North Hampton and ten seasons at Mill Valley Farm. If she could be one flower at the farm, she would be a hardy chrysanthemum.

### For More Information:

If you have questions, please contact us.

**Call:** (603) 659-7038

**Write:** Adventures In Agriculture at MVF  
c/o North Twin Education Programs  
259 Wadleigh Falls Road  
Newmarket, NH 03857



### Mill Valley Farm History:

*The land at Mill Valley has been farmed since the late 1600s and has been in farmer David Batchelder's family for six generations.*

*In 1991, over half of the land at Mill Valley Farm was protected from future development by a conservation easement, ensuring that the land would remain open space for future generations.*

*Visitors to the farm are welcome to enjoy the footpaths and ski trails on the easement land.*

*In the course of its long history, the farm has supplied the community with many different agricultural products. Today, Mill Valley Farm is a diversified farm, certified organic by the State of NH. The farm produces organically-grown vegetables, small fruits, flowers, seedlings, herbs, hay, compost and eggs from free-range hens. These are available seasonally at the farmstand on the property, at local farmer's markets, and through the Mill Valley Farm CSA.*

*Mill Valley Farm's Community Supported Agriculture project was conceived in the fall of 1994 and began its first shareholder distributions during the 1995 growing season. Currently Mill Valley's CSA involves about seventy-five households in the greater NH Seacoast area.*



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### REGISTRATION FORM:

Complete & return with \$25 tuition deposit to:

**Adventures in Agriculture at Mill Valley Farm**  
259 Wadleigh Falls Rd, Newmarket, NH 03857

### Participant Information:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_

Age: \_\_\_\_\_ Grade (Fall 2000): \_\_\_\_\_

School: \_\_\_\_\_

Parent Name(s): \_\_\_\_\_

\_\_\_\_\_

### Tuition Information:

- \$225 (less \$25 deposit)
- \$190 CSA/MVF members (less \$25 dep.)

### Membership Info (for discounted tuition)

- Current CSA Shareholders
- Current Mill Valley Farm Members
- Please send membership info to us!

**Tuition Deposit**..... \$25.00

Please make checks payable to:

North Twin Education Programs

### Camp Session Choice:

- 1 - July 10-14 & July 17-21
- 2 - July 24-28 & July 31-Aug 4

FOR OFFICE USE ONLY:

dep	ck
bal	ck
reg	saf
hf	

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2000 Brochure PZ