



LITTLE GREEN THUMBS

BUL 937

Growing Food Safely in Idaho School Gardens

Ariel Agenbroad

Surine Greenway

Jang Ho Kim

Joey Peutz

Contents

- 1 Introduction
- 2 Identifying Risks
- 2 Good Gardening Practices
- 3 Season-Long Safety Precautions
- 4 Integration with Food Service
- 5 School Garden Produce in the Classroom
- 6 Additional Safety Concerns
- 6 Pop Quiz Answers
- 7 Additional Resources
- 8 Printable Safety Checklists



Introduction

THE BENEFITS OF YOUTH GARDENS, whether in schools, preschools, or childcare settings, are well documented and widely understood. Children who participate hands-on in growing fresh fruits, vegetables, and herbs are more likely to try these foods and make healthy choices. They learn valuable social and life skills in a garden, like cooperation, responsibility, and accountability. They apply concepts of math, science, and health in a living classroom to direct experiences. Gardens can also be valuable places for children to begin a lifelong connection with nature and to explore, recreate, and reflect.

When planning a school garden, questions often arise about the safety of children participating in garden activities and the potential risks associated with consumption of fresh foods grown in these settings. Additional questions may address whether produce grown in school gardens is allowed for use in school kitchens, lunchrooms, or classrooms.

With a little planning, foresight, and attention to creating and following general rules of conduct, organizers can establish school gardens where students learn how to apply good gardening and hygienic food-handling practices in order to grow produce that is safe to eat in various settings. In fact, the Idaho Department of Health and Welfare has recognized that the practice of using produce grown in and harvested from a school garden is acceptable for use in school kitchens and classrooms. Therefore, school garden produce is an approved source.

This guide is created for teachers, parents, volunteers, school administrators, food-service professionals, and everyone else engaged in youth gardening projects in Idaho. It is meant to serve as a guide for implementing recommended gardening and food-handling practices to ensure that fresh-picked fruits and vegetables grown by youth are also safe for them to eat and enjoy.

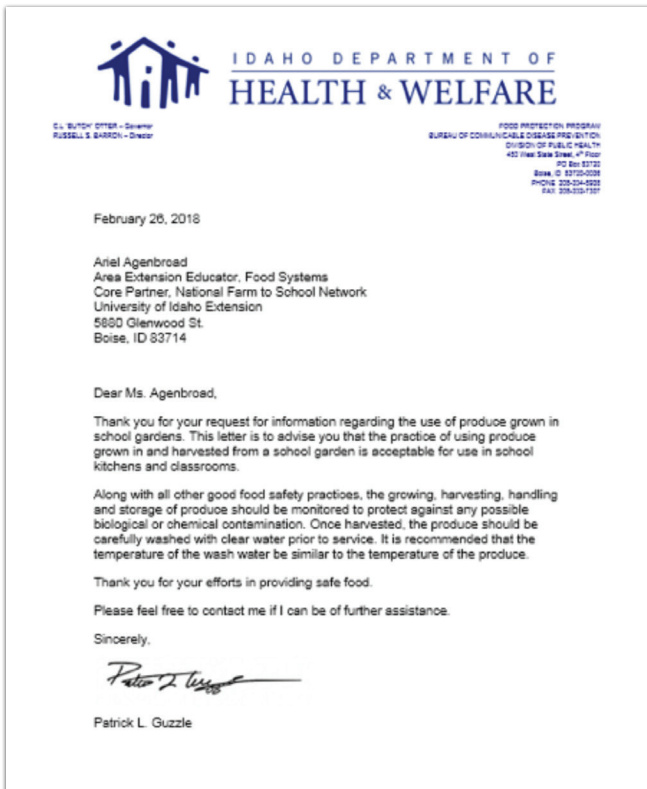


Figure 1. 2018 Letter of Support from the Idaho Department of Health and Welfare.

Identifying Risks

The general risks to children in a school garden setting are primarily the safety hazards associated with simply being outdoors. Children may have known or unknown allergies or sensitivities to plants and insects, and they may be exposed to sunburn, cuts, scrapes, or splinters. They could potentially ingest nonfood plants. Garden produce itself is not inherently dangerous, but it can become contaminated by pathogens carried in human or animal feces. Contamination occurs primarily through contact with dirty hands, tools, water, or manure products. Produce can also harbor illness-causing microbial growth if it spoils, becomes damaged, or if it is stored improperly.

Pop Quiz 1: True or False?

Bacteria such as *Salmonella* and *Escherichia coli* O157:H7 cause foodborne illnesses.

(Answers to pop quiz questions on page 6.)

Good Gardening Practices

Everyone involved in a youth garden project is responsible for ensuring that safe and clean food is produced and for reducing risks to participating children.

Soil

Good practices begin in the planning phases, before the garden is even established. To avoid contamination from heavy metals (like lead), industrial toxins, or sewage, locate the garden away from wells, septic systems, in-ground storage tanks, dumpsters, or anywhere heavy equipment or industrial machinery has been stored long-term. Soil contaminated with lead could be transferred to children’s hands or cling to produce and potentially be ingested. Test soils for lead (see Additional Resources section) and avoid areas where the lead level is above 300 parts per million. It is best to avoid locating the garden in low-lying areas with flooded or poorly drained soils. Contact the University of Idaho Extension office in your county to learn more about soil testing. Consider the source when purchasing or receiving bulk topsoil. It might be a good idea to ask questions about the history of the material.

Water

When watering school gardens, the safest water source will be one that is free from detectable *E. coli*. If the garden will be watered with municipal or city water, keep records of regular water-quality reports. If using



well water or irrigation water from another source, test the water for coliform bacteria, arsenic, and nitrates. If water is contaminated, treat it or use water from another source. Water collected in rain barrels should be considered nonpotable. If using rain barrels, install screens or barriers to keep debris, insects, and other animals from contaminating the water, and use caution when applying it directly to food plants. Using rain barrel water in a drip irrigation system will reduce the likelihood of collected water from coming in contact with the edible portions of the crop.

Compost and Manures

While compost and animal manures can be sources of organic soil fertility in a garden, they can present serious risks if handled, stored, and applied improperly. Avoid using animal manures in a school garden. Compost can be a safer choice. Composting is an excellent way to divert organic wastes from a landfill, and many schools are successfully implementing composting activities. However, compost can pose a risk unless a scientifically valid method of composting is used that reduces or eliminates disease-causing microbes. Do not allow manures in school compost piles; instead use only vegetable scraps, leaves, grass, and shredded paper. Protect school compost piles from being used as a location for people to deposit dog droppings.

Until a school composting program can be implemented that effectively reduces risks, it may be safer to use a commercial compost. Commercial compost has been processed so that it reaches high temperatures for an appropriate length of time to kill pathogens, weed seeds, and other contaminants. If possible, obtain documentation from the compost supplier that confirms the method used and provides an analysis of the finished product. Other fertilizer products made from animal origins, such as commercially packaged bone meal, blood meal, or fish fertilizer are safe to use as fertilizer or soil amendments because they have been sterilized.

Manure is not the only potential source of feces-borne pathogens in the garden. Make an effort to exclude rodents, birds, and any pet dogs or cats from the garden. Keep an eye out for signs of animal intrusion. Restrict garden participants from bringing animals onto the site. Consider fencing or netting to deter

wildlife and installing signage to prohibit visitors from bringing neighborhood pets into the garden.

Fertilizers and Pesticides

Commercial chemical fertilizers and insect and weed killers may be safe when used according to the directions on the product label, but all pose risks when stored or used incorrectly. To ensure the safest possible environment for children, it might be best to avoid their use entirely. Remember that a school garden is a learning lab—observing the interactions between plants and insects, weeds, and even plant diseases offers teachable moments. If pest problems occur, manage insects with scouting, removal by hand, or trapping, not chemicals. Explore using natural enemies; for example, attracting lady beetles to the garden to control aphids. Manage weeds with cultivation, hand weeding, and mulches.

If chemicals are used in or near the garden, keep all herbicides, fungicides, or insecticides at least twenty-five feet away from the garden and stored out of reach in a locked and well-marked secure location. They should only be applied by adults. Never repackage chemicals or fertilizers. Always store them in their original containers with original labels. Always read and follow all label instructions, even when using organic products where the perceived risk is lower. Many products, whether natural or synthetic, can be toxic when misused or mishandled. Check with the school or district office for policies regarding chemical use on school grounds.

Season-Long Safety Precautions

All children participating in a garden should have parental permission slips on file with information on allergies or sensitivities. Hands should be washed before and after spending any time in the garden. Children should be encouraged to wear closed-toed shoes and gloves, hats, and sunscreen when in the garden.

Children or adults who are sick or who exhibit any symptoms of illness, such as fever, diarrhea, vomiting, jaundice, persistent sneezing, coughing, or runny nose, must not handle any fresh produce. Instead, assign them another task so that they are not excluded from activities. Alternative activities may

include keeping track of harvest records, scouting for weeds or insects on the perimeter of the garden, or any other appropriate task that does not directly require them to come in contact with the produce. Lastly, children should not eat anything from the garden without prior adult approval!

Included in this guide is a printable school garden safety checklist that can be used to remind students, staff, and volunteers of measures to follow when going out to the garden.

Pop Quiz 2:

Which of the following is the most effective way to wash hands?

- Ten seconds of vigorous scrubbing in cold water
- Twenty seconds of scrubbing hands with warm water and soap
- Hand sanitizer
- Just water is enough

(Answers to pop quiz questions on page 6.)

The Lowdown on Washing Up

One of the primary pathways for contamination of fresh produce is through dirty hands. While good hygiene practices are likely part of the classroom culture, it is especially important to pay attention to hand washing and hygiene when spending time in the garden and when handling or consuming fresh produce. At a minimum, hand washing should happen:

- After using the restroom
- Before and after going into the garden
- Before and after harvesting produce
- Before and after food preparation
- Before and after eating

How to Wash Up

Please note that hand washing does not kill germs; rather the purpose is to remove dirt and germs. Soap acts as a surfactant (a slippery surface), making it difficult for germs to “hang on” and thus easier to remove from hands. Whenever possible, have youth wash their hands using clean running water



and soap, scrubbing for twenty seconds (or as long as it takes to sing the alphabet song) and rinsing well. It is not necessary to use antimicrobial soap. It is important to remember to put these steps into practice each time children will be in the garden or handling any of the produce from the garden.

Integration with Food Service

In many Idaho schools or childcare centers, produce from school gardens is being incorporated into school meals and snacks. In a very small school or childcare center, garden produce may significantly augment purchased food during the growing season. In larger schools, the produce may be highlighted once or twice a week as a featured item in a salad bar or in a special dish.

Children will often be very excited to see their produce on the menu in the cafeteria. Kitchen staff, however, may face limitations or challenges in making this happen. Remember that school food-service staff are under pressure to provide hundreds if not thousands of meals every day that meet stringent nutritional and budgetary requirements. They also have limited time to handle and prepare the produce. Enlist food-service staff as allies in supplying healthful food to students and ask how you can work together. Kitchen staff are often well trained in food safety as well, and should be considered a resource.

To use school garden produce in a school lunchroom, the kitchen must be able to receive, process, and store produce. School menus are often planned well in advance. If it is desirable that school garden produce be incorporated, begin working with staff before the garden is even planted. Early communication with food-service staff about what will be growing in the garden, how much will be available, and when it will be harvested will help staff plan how to use it. Prepare ahead of time how school garden produce will be identified on the menu or in cafeteria signage.

School Garden Produce in the Classroom

Using school garden produce in the classroom as a snack is often simpler than incorporating it into a school meal, especially when the harvest will be small. In this situation, children are given the



opportunity to directly sample the results of their hard work. Eating fresh produce in the classroom also provides unique opportunities to utilize the food in multiple lessons related to science, health, nutrition, and even math. Examples could include comparative taste tests, food experiments, recipe development, and more. Your county Extension office can assist you with accessing a variety of high-quality 4-H curricula appropriate for different age groups. Other suggestions are listed in the Additional Resources section of this guide.

From Garden to Kitchen or Classroom

Use only clean, food-grade containers to harvest and transport produce. Examples include: plastic or stainless-steel kitchen colanders or bowls, five-gallon food-safe or food-grade High Density Polyethylene plastic buckets, plastic produce bags, and paper grocery bags. Plastic trash-liner bags are not food safe. Whenever possible, brush, shake, or rub off excess soil outside before bringing in produce from the garden. No matter where or how the produce will be used, sanitary harvest and handling practices will ensure that the food is as safe as possible.

Safety in Preparation

Included in this guide is a food-preparation safety checklist. By using this checklist in the food preparation areas, it can help with proper food handling. Remember, there are many different times from garden to kitchen that food can be handled in an inappropriate manner. Following these guidelines can lower that risk and help to prevent the spread of foodborne illness. All individuals involved with food preparation or consumption should wash their hands prior to handling produce. By encouraging students to practice these skills in the classroom and reminding them to follow these same practices at home, you are teaching and encouraging them to adopt safer food-handling practices.

Rinse fresh produce under cool running potable water, even for produce with thick skins and rinds. It is appropriate to use a vegetable brush on produce with thick, rough skin or rinds. The surface of this produce can harbor bacteria that can enter the food when cut. When washing produce under

cool running water, do not use soap, detergent, or bleach. There are many commercial produce washes available, but they are not necessary. If using these washes in the classroom, make sure they are designed for fresh produce and follow the manufacturer's recommendation on use. Clean and sanitize vegetable brushes frequently if used.

Avoid cross contamination with other foods by making sure there is access to separate cutting boards and that equipment washing stations are readily available. Cutting boards should be designated for the preparation of one kind of food product: raw food, cooked food, vegetables, or meat, etc. Clean work surfaces and equipment before and after each use. Sanitize work surfaces with a diluted bleach solution (one tablespoon of unscented chlorine bleach to one gallon of clean water) and allow to air dry. Remind students to follow the food preparation checklist both in the classroom and when they are preparing food in their own home.

Keep fresh produce out of the temperature "danger zone" during and after food preparation. The danger zone is between 40°F and 140°F.

Safety in Storage

Whenever possible, avoid washing produce before storing. The added moisture will cause faster microbial growth and breakdown of the produce, shortening its shelf life and ability to be consumed. If washing is necessary, make sure to dry produce before storing. Store unwashed produce in plastic bags or containers, making sure the bins are clean. Most produce should be stored at 40°F or below in the refrigerator. Some exceptions include onions, potatoes, and winter squashes. Tomatoes can be stored in the refrigerator but will lose some flavor.

More about Storage

It is important to know how to properly store different types of produce. For example, onions and potatoes can be stored unrefrigerated in cool, dry, pest-free areas, while leafy greens requiring cold temperatures and high humidity should be kept wrapped and refrigerated. Refer to a storage chart for length of time to store fresh produce safely. Make sure to regularly check produce in storage to ensure quality. Do not serve cut fruits or vegetables if they have been held at room temperature for longer than two hours, or one hour above 90°F.

Additional Safety Concerns

General best management practices apply to most produce from school gardens, local farms, and distributors. The U.S. Department of Agriculture (USDA) has prepared extra guidelines for handling melons, tomatoes, leafy greens, and sprouts, as these produce items are more frequently implicated in foodborne illness outbreaks. This information can be accessed through the Additional Resources section.

Pop Quiz 3: True or False?

School garden-grown produce is inherently unsafe and should not be fed to children.

(Answers to pop quiz questions below.)

In Idaho, school garden efforts are supported by the state departments of agriculture, education, and health. These state agencies, along with University of Idaho Extension, each contribute to the promotion and success of school gardens in complementary ways. More about these agencies and how they can be of assistance can be found later in the Additional Resources section of this publication.

Pop Quiz Answers

1: True. Food crops can become contaminated with these pathogens through contact with animal droppings, human waste, polluted water, dirty hands, equipment, or utensils.

2: The most effective ways for hands to be washed, in order, are:

- Twenty seconds of scrubbing hands with warm water and soap
- Ten seconds of vigorous scrubbing in cold water
- Hand sanitizer
- Just water

3: False. When proper food-handling practices are used, both in the garden and in food preparation, produce can safely be given to children to consume. Food crops become contaminated with harmful microbes by coming in contact with animal droppings, human waste, polluted water, dirty hands, equipment, or utensils.

Additional Resources

University of Idaho Resources

University of Idaho Extension

Extension professionals work with the people of Idaho to address agricultural, natural resource, youth, family, community, and environmental issues.

www.uidaho.edu/extension

University of Idaho Extension Farm to School

uidaho.edu/farm2school

University of Idaho Food Safety

Provides resources, expertise, and training to help solve problems that impact community health.

<http://www.uidaho.edu/cals/family-and-consumer-sciences/research-and-extension/food-safety>

State Resources

Idaho Department of Health and Welfare (and Health Districts)

<https://healthandwelfare.idaho.gov/>

Idaho Department of Agriculture Farm to School Program

<https://idahopreferred.com/farm-to-school/>

National Resources

National Farm to School Network

<http://www.farmtoschool.org/>

USDA Community Food Systems, Child Nutrition, and Farm to School Resources

<http://www.fns.usda.gov/farmtoschool/farm-school>

https://fns-prod.azureedge.net/sites/default/files/foodsafety_schoolgardens.pdf

Authors

Ariel Agenbroad, Area Extension Educator, Community Food Systems and Small Farms, Southern District;

Surine Greenway, Extension Educator, Family and Consumer Sciences, Owyhee County; **Jang Ho Kim**, Extension Specialist, Consumer Food Safety, College of Agricultural and Life Sciences, Moscow; **Joey Peutz**, Extension Educator, Family and Consumer Sciences, Payette County

ALWAYS read and follow the instructions printed on the pesticide label. The pesticide recommendations in this UI publication do not substitute for instructions on the label. Pesticide laws and labels change frequently and may have changed since this publication was written. Some pesticides may have been withdrawn or had certain uses prohibited. Use pesticides with care. Do not use a pesticide unless the specific plant, animal, or other application site is specifically listed on the label. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

Groundwater—To protect groundwater, when there is a choice of pesticides, the applicator should use the product least likely to leach.

Garden Safety Checklist

1 GARDEN SITE

- Garden is located away from septic drain fields, flood zones, chemical storage, or garbage collection.
- Garden soil has been tested for toxins such as arsenic and lead, or a commercial soil mix is used.
- Garden is located away from traffic, utilities, or other physical hazards to youth.
- If used, raised beds or container gardens, stakes, and trellises are constructed of nontoxic materials.
- Only potable water is used for irrigation, handwashing, and washing of produce.

2 HEALTH AND HYGIENE

- Toilet and handwashing facilities are available to garden participants at all times.
- Garden participants have washed their hands prior to entering the garden.
- If used, garden gloves are washable and washed after each wear.
- Garden participants have access to a fully stocked first aid kit.

3 SUPERVISION AND SAFETY

- Children will be supervised by a sufficient number of trained, qualified adults while in the garden.
- If required, parental/guardian permission forms are on file.
- Youth or adults with serious allergies are documented and appropriate precautions established.
- Youth or adults exhibiting signs of illness are temporarily prevented from working in the garden.
- Emergency and safety policies are in place and adults and/or youth have been trained on these policies.
- Youth have been instructed on proper garden attire, rules of behavior, and what to do in an emergency.

4 COMPOST AND MANURES

- Animal manure use is avoided in the garden.
- Properly treated compost is purchased from a reliable, commercial source.
- Students follow label directions for any soil amendment and fertilizer applications, under adult supervision.

5 TOOLS AND EQUIPMENT

- All tools and equipment are safely stored and access is managed by adults.
- Youth have been trained on the safe and appropriate use of garden tools.
- Harvest tools are washed and, if possible, sanitized after use.

6 ANIMALS AND PESTS

- Domestic and wild animals are excluded from the garden.
- Pests are managed without the use of chemicals whenever possible.
- If chemicals are used, they are applied by a qualified adult and follow label instructions and school district policies.

Classroom Food-Preparation Safety Checklist

1 PERSONAL HYGIENE

- Handwashing sinks are fully stocked with soap, disposable towels, and water, with waste bins nearby.
- Everyone handling food or eating has washed their hands.
- Eating and drinking occur outside of the immediate food-preparation area.
- Hair restraints are used, if necessary.

2 FOOD PREPARATION

- Produce is washed in cool running potable water prior to preparation or eating.
- All equipment, utensils, and surfaces are washed, rinsed, and sanitized before and after each use.
- Ingredients are kept out of the temperature “danger zone” (danger zone is between 40°F and 140°F).
- Cross contamination is prevented (i.e., fresh produce is washed and prepped; separate cutting boards for produce and meat are identified; or fresh or cooked foods are used, etc.).
- Food is handled with clean hands, single-use gloves, or clean tongs/utensils.
- Clean, reusable towels are used for sanitizing, not for drying hands, utensils, or the floor.

3 COLD HOLDING

- Refrigerator is kept clean and organized. Containers are labeled with contents and a date.
- Temperature of cold food being held is at or below 40°F.
- Produce is never stored underneath or near raw meat or other items in such a way that it could become contaminated.

4 REFRIGERATOR/COOLER

- Thermometers are used for testing equipment.
- Interior of coolers is kept at or below 40°F using ice packs, ice, or dry ice.
- All food is properly wrapped, labeled, and dated.
- Proper chilling procedures are used.
- First food-in, first food-out method is used.

5 CLEANING AND SANITIZING

- Only potable water is used for any washing or food preparation.
- Water is clean and free of grease and food particles.
- Water temperatures are correct for wash and rinse.
- All cutting boards, surfaces, utensils, and knives are washed, rinsed, and sanitized after use.
- Everyone has washed their hands after food preparation and eating.