

Make the Case **Guide**



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Gather Your Resources

National Science Standards



National Science Standards

Plant-based activities, gardening, and environmental studies provide great opportunities for implementing National and State Science Education Standards. Such opportunities go far beyond the basic study of plants themselves to include life cycles, ecosystems, soil, weather, organisms, and many science process skills such as measuring, charting, collecting data, and reporting.

Kindergarten

Life Science:

Content Standard 2: Observe, investigate, describe and classify living things; explain life cycles, diversity, adaptations, structure and function of cells and systems reproduction, heredity, interdependence, behavior, flow of energy and matter and changes over time.

Performance Standards

The student:

- uses senses to observe characteristics of organisms using hand lenses when appropriate (earthworms, insects, flowers, vegetables, seeds, etc.). Describes similarities and differences between organisms (verbal descriptions, drawings, dictated findings).
- sorts and classifies seeds, contributes to a picture graph.
- describes similarities and differences between organisms; (verbal descriptions, drawings, dictated findings).
- observes various classroom plants and classroom animals, contributes daily to needs, describes basic needs and how to keep them healthy.
- observes and describes organisms in their environments; (habitats on school grounds, trees, under rocks, puddles, aquaria, etc.).
- observes organisms in their environments; (distinguishes living and non-living things; describes different organisms and what they eat, etc.).
- draws and decides on a rule to sort organisms observed. Sorts and tallies pictures of organisms observed.

Essential Knowledge and Skills

The student:

- uses senses to find out about surroundings and her/himself. Explains how different senses give different information.
- chooses magnifiers to help see things that could not be seen without them.
- cares for organisms to know that most living things need water, food, and air.

Technology Integration

The student:

- uses tools such as magnifiers, thermometers and microscopes to examine organisms.

Grade 1

Life Science

Content Standard 2: Observe, investigate, describe and classify living things; explain life cycles, diversity, adaptations, structure and function of cells and systems, reproduction, heredity, interdependence, behavior, flow of energy and matter and changes over time.

Performance Standards

The student:

- observes and describes differences and a variety of different types of similarities in basic characteristics and behavior of organisms.
- investigates and describes the relationship between structure and function within organisms (e.g., wings and flight; roots, stems, seeds, leaves of plants and their roles in meeting basic needs).
- grows a colony of earthworms in the classroom.
- examines, with the use of hand lens when necessary, the different individuals in the populations and writes or uses pictures to show the similarities and differences between them.
- grows a plant from a bulb and describes similarities and differences between this plant and those of the other students. Writes or uses pictures to compare the plant to any other plant in their neighborhood.
- compares and describes the behavior of living things in relation to the nature of their environments (e.g., plants and animals in a terrarium and in an aquarium).
- observes and cares for classroom animals and plants and explains the similarities and differences in their requirements.
- distinguishes real from fanciful attributes given to plants and animals in stories, movies, poems, CD-ROMs, etc.

Essential Knowledge and Skills

The student:

- chooses magnifiers to help see things they could not see without them.
- cares for organisms and concludes that plants and animals both need to take in water, and animals need to take in food. In addition, plants need light.
- investigates organisms to know that different plants and animals have external features that help them thrive in different kinds of places.
- explains differences in stories that sometimes give plants and animals attributes they really do not have.

Technology Integration

The student:

- uses tools such as computers, clocks, hand lenses, thermometers, and balances to collect information.
- uses word processing programs to write about organisms.

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National Science Standards



Earth and Space Sciences

Content Standard 4: Observe, investigate, describe and explain the properties, structure, and origin of the earth system, the solar system and the universe. Observe, investigate, describe and explain changes in the earth and sky with time, energy in the earth system and geochemical cycles.

Performance Standards

The student:

- observes, describes, and compares physical properties of soil, water retention, layer formation, and decomposition of materials. Observes erosion on school ground or in the neighborhood.
- compares three different types of soil to describe observable properties and investigates effect of each on plant growth.
- collects, organizes, and analyzes patterns in data to infer the effect of different types of soil on plant growth.
- constructs histograms, stem-and-leaf plots and box plots of the seeds growth planted in different soils.
- constructs and explains time series plots of root growth in different soils.
- investigates how water moves through different earth materials.

Essential Knowledge and Skills

The student:

- conducts investigations to know that soil is made partly from weathered rock, partly from plant remains and also contains many organisms.

Technology Integration

The student:

- uses tools such as computers, clocks, hand lenses, thermometers and balances to collect information about the weather.

Grade 3

Life Science

Content Standard 2: Observe investigate, describe and classify living things; explain life cycles, diversity, adaptations, structure and function of cells and systems, reproduction, heredity, interdependence, behavior, flow of energy and matter and changes over time.

Performance Standards

The student:

- creates an artificial habitat using plants and animals together. Identifies food sources for different organisms based on observation of the habitat and creates food webs based on observations (fish, crabs, fruit flies, plants). Explains the role of each organism in the food chain.
- observes and records effects of changes on the created habitat (e.g., changes in light, temperature, water, population).
- grows, observes, and completes the life cycle of a plant including

pollination and collection of seeds for the next generation. Measures and makes drawings of observations of the growth of a plant.

- collects and describes evidence to explain effects of temperature, light, and water on the life cycle, dispersal methods, traits, and variation in plants.
- investigates and describes the parts of plants; explains and predicts the functions of different parts of a plant.

Essential Knowledge and Skills

The student:

- collects evidence from selected habitats to know that changes in an organism's habitat are sometimes beneficial to it and sometimes harmful.
- infers that for any particular environment, some kinds of plants and animals survive well, some survive less well and some cannot survive at all.
- concludes that insects and various other organisms depend on dead plant and animal material for food.
- reasons that almost all kinds of animals' food can be traced back to plants.
- produces evidence to explain that some source of "energy" is needed for all organisms to stay alive and grow.
- investigates organisms to know that they interact with one another in various ways besides providing food. Concludes that many plants depend on animals for carrying their pollen to their plants or dispersing their seeds.

Technology Integration

The student:

- uses tools including hand lenses, clocks, thermometers, balances, computers, rulers, meter sticks, measuring cups, calculators, microscopes, cameras, safety goggles and sound recorders to collect and analyze information.
- uses educational software, drawing and writing tools to gather information about the life cycles of several plants in different environments and produces a report showing the role of animals in pollination and/or seed dispersal of three plants.

Grade 4

Life Science

Content Standard 2: Observe, investigate, describe and classify living things; explain life cycles, diversity, adaptations, structure and function of cells and systems, reproduction, heredity, interdependence, behavior, flow of energy and matter, and changes over time.

Performance Standards

The student:

- observes and groups organisms or specimens to identify similarities and differences among them (live specimens as well as videos, and pictorial representation of animals, plants, fungi, single-celled

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National Science Standards



organisms, bacteria).

- constructs a large or small-scale compost pile in the fall and records changes in decaying material over time. Explains reasons that these changes are taking place (compost pile can be indoors or outdoors and product can be used for spring planting).
- uses and explains data collected for a back-to-back histogram, parallel box plot or time series plot to compare pollution on plant growth.
- uses stereomicroscope to examine the organism in 'compost tea' at monthly intervals. Draws representative organisms and explains why there are changes in the types of organisms present at different times.

Essential Knowledge and Skills

The student:

- observes that organisms interact with one another in various ways besides providing food. Investigates ways that many plants depend on animals for carrying their pollen to their plants or dispersing their seeds.
- conducts a long-term investigation to know in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
- deduces that over the whole earth, organisms are growing, dying and decaying, and new organisms are being produced by the old ones.
- observes and describes how organisms interact with one another in various ways besides providing food. Observes that many plants depend on animals for carrying their pollen to their plants or dispersing their seeds.

Technology Integration

The student:

- uses measuring tools to collect accurate data for comparing objects and events for designing and constructing things.
- uses communication and word processing software to construct journal entries and scientific reports of related narratives.

Earth and Space Sciences

Content Standard 4: Observe, investigate, describe and explain the properties, structure, and origin of the earth system, the solar system and the universe. Observe, investigate, describe and explain changes in the earth and sky with time, energy in the earth system and geochemical changes.

Performance Standards

The student:

- constructs weather instruments and a weather station. Gathers data and compares weather and its affects on areas in different parts of the country.

Technology Integration

The student:

- uses measuring tools to collect accurate data for comparing objects and events for designing and constructing things.

Grade 5

Life Science

Content Standard 2: Observe, investigate, describe and classify living things; explain life cycles, diversity, adaptation, structure and function of cells and systems reproduction, heredity, interdependence, behavior, flow of energy and matter and changes over time.

Performance Standards

The student:

- compares fossil plants and animals in the classroom, field, or museum. Prepares comparative charts, tables, descriptions, etc., to show similarities and differences with existing organisms.

Essential Knowledge and Skills

The student:

- examines environments to know for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
- gives examples of how some source of energy is needed for all organisms to stay alive and grow.
- examines various fossils to know they can be compared to one another and to living organisms according to their similarities and differences. Some organisms that lived long ago are similar to existing organisms, but some are quite different.

Technology Integration

The student:

- uses a variety of tools to collect and analyze data such as the computer, calculators, microscopes, cameras, hand lenses, thermometers, compasses, balances, hot plates, meter sticks, sound recordings, and safety apparatus.
- uses multiple sources of information such as the internet, print, instructional TV and databases.

Grade 6

Earth and Space Sciences

Content Standard 4: Observe investigate, describe and explain the properties, structure, and origin of the earth system, the solar system and the universe. Observe, investigate, describe and explain changes in the earth and sky with time, energy in the earth system and geochemical cycles.

Performance Standards

The student:

- observes, records, and describes patterns of changing weather and how they are measured.
- designs and carries out a study to compare the composition of soils sampled from three different locations in the Washington, DC area.

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National Science Standards



Essential Knowledge and Skills

The student:

- performs experiments to know although weathered rock is the basic component of soil, the composition and texture of soil and its fertility and resistance to erosion are greatly influenced by plant roots and debris, bacteria, fungi, worms, insects, rodents, and other organisms.

Technology Integration

The student:

- operates a weather station and makes daily measurements of temperature, pressure, humidity, wind direction, and rainfall. Maintains graphs of these data and compare with daily weather maps as well as radar maps of cloud cover. Identifies the types of clouds (cumulus, cirrus, stratus, and numbus). Makes weather predictions.
- uses communication and word processing software to construct journal entries and scientific reports or related narratives.

Grade 7

Life Science

Content Standard 2: Observe, investigate, describe and classify living things; explain life cycles, diversity, adaptations, structure and function of cells and systems reproduction heredity, interdependence, behavior, flow of energy and matter and changes over time.

Performance Standards

The student:

- designs and conducts at least one experiment to show the influence of the physical environment on the survival of primary producer.
- describes what the ecosystem would be like in the absence of decomposers.
- selects one species of plant and one species of animal in studied ecosystem. Justifies why each can be considered a species.
- selects a group of animals or plants in the studied ecosystem and devises a key based on external features, which may be used to distinguish one species from another.
- designs a simulation of how the characteristics of one species might change with successive generations if one of the physical conditions in the ecosystem were gradually changing. For example, the average annual rainfall might increase or the average temperature might decrease.

Essential Knowledge and Skills

The student:

- examines energy inter-relationships to know that food provides the molecules that serve as the fuel and the building material for all organisms. Plants use the energy from light to make sugars from carbon dioxide and water. This food can be used immediately or stored for later use. Organisms that eat plants break down the plant structures to produce the materials and energy they need to survive before they are consumed by other organisms.

- observes an ecosystem to understand that two types of organisms may interact with one another in several ways: They may be in a producer/consumer, predator/prey, or parasite/host relationship. Or one organism may scavenge or decompose another. Relationships may be competitive or mutually beneficial. Some species have become so adapted to each other that neither could survive without the other.
- examines an ecosystem in detail to know that over a long time, matter is transferred from one organism to another repeatedly and between organisms and their physical environment. As in all material systems, the total amount of matter remains constant, even though its form and location change.
- describes how energy can change from one form to another in living things. Animals get energy from oxidizing their food, releasing some of its energy as heat. Almost all food energy comes originally from sunlight.
- identifies in the studied ecosystem at least one member of each of the kingdoms of living things (plant animal, fungus, protist, bacteria). Explains why any of the kingdoms is under-represented or absent.
- grows a population of one species of fern from spores. Uses stereomicroscope to follow and record the complete life cycle from spore germination, gametophyte development, sexual reproduction, embryo development and growth of mature sporophyte. Collects data to demonstrate variation within the population. Explains how the various stages of the life cycle enable ferns to survive in the natural environment.
- compares different reproductive strategies to know that in some kinds of organisms, all the genes come from a single parent, whereas in organisms that have sexes, typically half of the genes come from each parent.
- performs investigations to know that animals and plants have a great variety of body plans and internal structures that contribute to their being able to make or find food and reproduce.
- observes a wide range of organisms to understand that one of the most general distinctions among organisms is between plants, which use sunlight to make their own food, and animals, which consume energy-rich foods. Some kinds of organisms, many of them microscopic, cannot be neatly classified as either plant or animal.

Technology Integration

The student:

- uses measuring tools to collect accurate data for comparing objects and events or for designing and constructing things.
- uses communication and word processing software to construct journal entries and scientific reports or related narratives.

Grade 8

Investigations focus on Physical Science at this grade level.

Use of a school garden to support science standards would depend on the teacher's application of lessons to the garden.

Gather Your Resources

Cross-Discipline Learning



Cross-Discipline Learning

Math

Kindergarten

- Measuring the schoolyard garden, both before and after construction, with various non-standard units.
- Identifying shapes in the garden.
- Recording the daily temperature on a classroom chart.

Grade 1

- Measuring the schoolyard garden both before and after construction with non-standard and standard units.
- Identifying two- and three-dimensional shapes in the garden.
- Collecting data on daily temperature in the garden and recording it on a classroom chart.
- Recognizing patterns in the garden.

Grade 2

- Measuring the garden in metric units.
- Dividing garden beds to gain understanding of simple fractions.
- Measuring the daily temperature and recording it.
- Identifying symmetry and asymmetry in the garden.

Grade 3

- Measuring the perimeter and area of the garden.
- Measuring temperature of air and soil in the garden.
- Dividing garden beds into fractional units.
- * Identifying geometric shapes and concepts in the garden.

Grade 4

- Measuring the garden and creating a map to scale.
- Identifying geometric shapes and concepts in the garden.
- Using the garden measurements to demonstrate fractions and decimals.
- Create a graph to illustrate data from plant studies, such as a bar graph to show the number of seedlings that sprout or a line graph to show the growth of a plant over time.

Grade 5

- Measure perimeter and area of the garden using metric units.
- Calculate the volume of soil in a plant bed.
- Create graphs to illustrate data from plant studies in the garden.
- Identify geometric shapes and concepts in the garden.

Grade 6

- Measure the garden; calculate the volume of soil in a garden plot.
- Observe a plant over time and graph its growth over time.
- Solve story/word problems related to the garden.

Grade 7

- Measure and calculate perimeter, area, surface area, and volume of garden beds.
- Create graphs to show data collected from experiments in the garden.
- Identify geometric shapes and concepts in the garden.

Grade 8

- Perform experiments in the garden, collect numerical data, and create a graph.
- * Identify geometric shapes and concepts in the garden.
- Practice various measuring techniques in the garden.

Social Studies

Kindergarten

- Identifying garden plants that are used or have been used by various cultures.
- Relate folk tales, fables, and myths to the garden.
- While discussing family roles of various cultures, highlight agriculture and/or gardening practices.

Grade 1

- Relate legends, myths, stories, and fables to the garden.
- Apply what is learned about rules of conduct and work to behavior in the garden.
- Relate study of elements of culture to the plants and activities in the school garden; grow plants used by various cultures.

Grade 2

- Apply rules of conduct, rights and responsibilities to behavior in the school garden.
- Introduce botanical/garden/agricultural details into study of the diversity of backgrounds of Americans; grow plants from other cultures in your school garden.
- Use the garden to illustrate simple economic concepts.

Grade 3

- Highlight gardens, plants, agriculture, and nature in study of cultural diversity. Grow plants from these cultures in the school garden.
- Consider how inventions and new developments in agriculture have influenced gardening practices used in the school garden.

Grade 4

- Use the garden to illustrate economic concepts such as effects of supply and demand.
- Grow plants from Africa and Asia.

Grade 5

- Discuss botanical/agricultural contributions by various cultures

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Cross-Discipline Learning



and grow some of the plants discussed.

Grade 6

- Use the garden to illustrate economic concepts such as effects of supply and demand.
- Grow plants from Africa and Asia.

Grade 7

- Investigate how agricultural discoveries and inventions changed daily life and affect practices in the school garden.
- Grow plants farmed or used by indigenous people.

Grade 8

- Investigate plants used by various Western Hemisphere civilizations; grow some examples.

Geography

Kindergarten

- Compare a simple map of the garden to the actual garden.
- Create and identify symbols to represent features on the garden map.

Grade 1

- Compare a map of the garden to the actual garden.
- Use a map legend to identify features on the garden map.
- Observe the weather and seasons effect on the garden.

Grade 2

- Create simple maps of the school garden.
- Collect data on weather and seasonal changes in the garden.

Grade 3

- Create map of school garden using relative locations: distance, scale, and map symbols.
- Discuss the neighborhood and/or community involvement in the school garden.
- Collect data on weather and seasonal changes in the garden.

Grade 4

- Create a scale map of the school garden.
- Collect data on weather and seasonal changes in the garden. Discuss their impact on the school garden.
- Use the garden to describe interaction of climate, weather, soil, and natural vegetation.

Grade 5

- Highlight crops and other plants that moved with human migrations; grow some examples.
- Collect data on weather and seasonal change in the garden; com-

pare this to historical patterns.

Grade 6

- Highlight crops and other plants that have influenced growth and decline of empires, political policy, and other human activities; grow some examples.
- Collect data on weather and seasonal change in the garden; compare this to historical patterns.

Grade 7

- Highlight crops and other plants that have human activities across the globe; grow some examples.
- Collect data on weather and seasonal change in the garden; compare this to historical patterns.

Grade 8

- Discuss the effect of climate on vegetation as it relates to the school garden.
- Use the school garden as an example when discussing patterns of land use.

Reading | English | Language Arts

Kindergarten

- Reading children's literature on plants, gardens, or nature.
- Exercises in following directions when planting or caring for the garden.

Grade 1

- Reading children's literature on plants, gardens, or nature.
- Writing and talking about the garden; asking questions about what is happening in the school garden.

Grade 2

- Reading children's literature on plants, gardens, or nature.
- Writing and talking about the garden; asking questions about what is happening in the school garden.

Grade 3

- Reading children's literature on plants, gardens, or nature.
- Writing and talking about the garden; asking questions about what is happening in the school garden.

Grade 4

- Reading children's literature, both fiction and nonfiction on plants, gardens, or nature.
- Writing and talking about the garden; giving a written or oral report on the garden.

Grade 5

Gather Your Resources

Cross-Discipline Learning



- Reading children's literature, both fiction and nonfiction on plants, gardens, or nature.
- Identifying literary devices in such literature.
- Writing and talking about the garden; giving a written or oral report on the garden.

Grade 6

- Reading literature, both fiction and nonfiction on plants, gardens, or nature.
- Identifying literary devices in such literature.
- Communicating about plans and tasks in the garden; making group decisions.

Grade 7

- Reading literature on plants, gardens, or nature – including a selection of folk tales, fables, and parables, and multi-ethnic literature.
- Writing a report or a research paper on a garden-related theme.
- Communicating about plans and tasks in the garden; making group decisions.
- Group presentations on a garden-related theme.

Grade 8

- Relating Greek and Roman mythology to the garden.
- Writing a research report on a garden-related theme.
- Individual and group presentation on garden-related themes.

Gather Your Resources

Estimating Project Costs



Estimating Project Costs

Here you will gather a basic understanding of expenses, which will require knowing what you need and getting estimates from your sources. This will make garden planning easier and will help you raise the funds you may require.

You should know:

- Area: Approximate square foot area the garden will cover
- Teachers: # of participating teachers
- Contributions: Financial and in-kind contributions you know are available to support the project

What's in a garden?

The basics

- Flowers
- Herbs
- Vegetables
- Access to water

These items can be arranged thematically depending on your goals.

Larger elements

- shrubs, perennials, and annuals
- some built elements such as a trellis entrance and raised beds
- wood chip paths to enable students to work in their garden
- possibly some small sculptural elements or signage to identify and individualize the garden

Water

Some schools have elected to incorporate a wetland or marsh, which provides great aquatic biodiversity without standing water. Others incorporate ponds and other large bodies of water.

Tip: Water needs to be handled very carefully. In addition to being expensive to build and maintain, a pond adds a liability to the school and may increase insurance costs and electrical work.

Calculating square footage

Finding the square footage of a garden is relatively simple if the space is a basic square. Simply calculate the area of the space using this formula:

$$\text{lenth} \times \text{width}$$

What if I have an odd-shaped space?

Here's an idea that is simple and fun for students to experiment with when working with an uneven edge or a swirl:

Take a length of twine or rope and use it to outline the odd-shaped bed. Mark the point on the rope at which it meets the starting point. Then, remove the rope from the garden bed, and re-place it on a lawn or cement area in a more traditional square or rectangular shape. Have your students measure the shape using a formula for area that they are learning in class.

For a rectangle use: **lenth x width**

For a circle use: πr^2

Where **r = radius** and $\pi = 3.14$

The area of the shape you calculate is equal to the area of the odd-shaped garden bed.

Example:

Your string measures 5 feet long and 6 feet wide in a rectangular shape.

$$5 \text{ feet} \times 6 \text{ feet} = 30 \text{ square feet}$$

Your total area is 30 square feet.

Tip: As long as no length is added to the rope, the area will remain the same no matter what shape the rope is in. Have students experiment with this concept by re-shaping the rope in several different sizes of squares, rectangles, triangles, or circles (whichever shapes for which they have learned area formulas) and then calculating the area—they should all be the same. This is a great way for students to review and master the basic concept that a defined area can take many different forms without increasing or decreasing in area.

Basis for calculating costs

Putting it all in perspective...

The suggestions below will give you some ideas of what you accomplish with a given amount of funds. Please keep in mind that these are suggested ideas, and that prices vary greatly depending on the area of the country you are in. Be resourceful! With specially-arranged school discounts, wholesale purchasing, or in-kind gifts, your available funds will stretch a lot further!

For \$100, you can purchase:

- enough produce for a wonderful "plant parts" lab (seeds, fruits, veggies—all foods that come directly from plant parts!)
- several gardening references, environmental/outdoor education curricular resources, or a small collection of plant/environmental-related children's literature for your classroom
- a small group of window box containers (probably 3-5, depending on individual cost) with seeds or plants, soil, and fertilizer to maintain them, or a few larger planters (2-3) to create a courtyard garden with container plantings
- a few shrubs (2-3), a tree, or a grouping of perennials to enhance

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- a pre-existing garden area
- a wagon or small garden cart

For \$250-300, you can purchase:

- for a classroom terrarium, or a small grow light system so that your students can start their own seeds or establish an indoor garden of tropical houseplants
- books such as gardening references, environmental/outdoor education curricular resources, or a collection of plant/environmental-related children's literature for your classroom
- materials to create 1-2 small garden plots (or one longer bed along the edge of a path or wall) with landscape timbers, topsoil, fertilizer, compost, seeds, and plants
- a classroom set of child-sized garden tools
- a heavy-duty garden cart

For \$500-1,000, you can purchase:

- a school garden library
- enough materials to create 4-8 garden plots (depending on cost of materials) with landscape timbers, topsoil, fertilizer, compost, seeds, and plants
- enough bulbs for a school-wide bulb planting event
- a small landscape area with several shrubs or small trees that define an outdoor reading nook—might be phase one of a "starter garden" to be added to as resources allow
- garden plants to support a specific theme or focus, such as native plants, a colonial herb garden, a butterfly garden, or a wildlife garden (especially perennials and grasses that live longer than single-year annual flowers)
- a landscape element such as an arbor, fountain, rock grouping, or a couple of benches to enhance an existing garden landscape

For \$2,500-5,000, you can purchase:

- a basic garden landscape with planting beds for an entire grade level as well as trees and shrubs to create a defined sense of space with an entryway—an outdoor classroom!
- contracting services for a local landscaper to provide labor for some of the more difficult aspects of garden installation such as sod stripping, irrigation installation, or bulldozer work, if needed (try to negotiate a discounted rate—remember, it's a tax write-off for the company)
- registration and travel for 2-3 teachers or parent volunteers to attend a school gardening conference

For \$5,000-10,000 (and up), you can purchase:

- additional landscape elements that enhance the garden but are more costly, such as brick paths, fencing, water features, irrigation systems, or electrical work
- contracting services for a local landscaper to provide labor for overall garden construction and installation, or for portions of it—some of the more difficult pieces such as sod stripping, laying irrigation, or bulldozer work

Tip: It may be necessary to obtain an estimate from a retailer, landscape architect, or contractor to determine how much money a certain feature will add to your expense list.

Tools

You will also need to purchase tools for students to maintain the garden and educational materials that teachers will use to make the garden a learning center. Quantity will depend on the number of teachers and students who will participate in building and maintaining the garden.

Garden elements that inflate costs

- over 5,000 square feet of area
- paving (as opposed to using wood chips)
- any major building
- a water feature, such as a pond or fountain
- hardscape structures, such as paving or arbors

Example

A sample school garden might cover approximately 50' x 75' (3,750 sq. ft.) and will not include any buildings, bricks paths, stonewalls, water features, or electrical work. Your total garden area could be smaller or larger, but should be big enough to accommodate the activities of several classroom groups. It is common for the total garden area to be divided between several adjacent zone areas.

For this garden example (which may be more or less than your garden), it costs approximately \$2-3 per square foot or \$7,500-11,250 to build.

The breakdown is:

- 2/3 materials
- 1/3 labor

In this example, we are assuming you will hire a crew to do sod stripping and other work that requires use of heavy equipment.

If you have suggestions to add based on your experience, please e-mail us.

Ready to start crunching some numbers?

Download the Cost Estimate Worksheet to get a rough idea of what your school garden will cost.

Cost Estimate Worksheet

The school garden will cover _____ square feet.

_____ teachers and _____ students will participate in the project.

Garden Materials (plants, soil, etc.) (approx. \$1.30 - \$2.00 per square foot)	\$ _____	
Contracted Labor & Construction* (approx. \$0.70 - \$1.00 per square foot)	\$ _____	
Educational Materials	\$ _____	\$ _____ cost per teacher
Garden Tools	\$ _____	\$ _____ cost per student
TOTAL	\$ _____	

* Here you may want to show estimates with and without some of the more expensive elements included. Depending on the size, scope, and cost of the proposed garden, you may also want to suggest several phases of construction. Make certain that Phase I is definitely "accomplishable" so that you have a successful initial phase. This will ensure that the project continues.

Create a Proposal



Proposal Resources and FAQs

Why create a proposal?

A school garden is a major commitment of time and resources for all involved. Often principals and other administrators will require you to develop a proposal before they will approve developing a garden. A proposal is a helpful document, as it creates a “word picture” of what the garden will be and how it will be used, so that everyone is “on the same page.”

By creating a proposal, you will...

- think through all aspects of planning for a school gardening program
- develop a powerful tool to show your school administration how your garden will support your curriculum
- speak in a confident and informed manner about the project
- identify and gather the support you will need

What's in the proposal?

Your proposal should sell your idea. It needs to provide a balance of enthusiasm for the garden along with practical details about how the garden will be funded, built, used, and maintained. The School Garden Wizard proposal outline will help you assemble these items into a formal proposal.

The following list will be addressed in your proposal. You will generate most of your information for the proposal in the Vision Meeting that is described in the next section, Plan for Success.

1. Educational rationale for the project

- How a garden supports the curriculum and state standards that you are already required to teach (not a new curriculum on top of everything else!)
- Examples of how plant-based activities can be used to support and teach state educational standards
- Examples of how school gardens have worked at schools like yours

2. Description of your ideal school garden and basic information about the garden

- Location
- Size
- Potential garden themes and plants
- Your (and your team's) creative, thematic ideas

3. Plan for getting the work completed, including a list of the names of people who want to participate and their tasks

4. Realistic predictions on the cost and potential sources of funding

5. Concluding statement or paragraph that re-states the need for and purpose of the garden and finishes the proposal

Where can I find information?

You will find a lot of information embedded throughout this Web site. You should also plan on holding a Vision Meeting to generate good ideas.

For educational ideas and garden themes, don't miss Learn in the Garden. Refer to Gather your Resources for learning standards and project costs.

Also, check out these organizations:

- American Community Gardening Association
- American Horticulture Society
- Garden Mosaics
- Junior Master Gardener Program
- National Gardening Association
- National Wildlife Federation
- North American Association for Environmental Education

Tips for writing a successful proposal

- Adapt the outline to suit your needs. Do not feel bound by the headings or order of the information; this is a suggested template. Remember, it has to work for YOU!
- Provide as much detail as you can. You won't have all the answers, but your proposal should reflect that you have carefully considered all aspects of creating a school garden and that you have planned to address each important issue.
- Emphasize details that will mean the most to those you want to convince. For example, if your principal is concerned about garden maintenance during summer months, then make certain your proposal addresses this thoroughly.

What kind of language should I use to write my proposal?

When describing ideas for your proposal, use language that makes it clear whether the ideas are exact plans or possibilities included as examples.

Illustrative possibility

“Our garden might include ...”

Definitive plan

“Students and faculty will brainstorm ideas for their garden that might become a setting for...”

“Since science is an emphasis at our school, the garden will provide an opportunity for...”

- Put the proposal into your own words. It should be personalized for your school so that it is obviously a custom plan, not a generic proposal. Let your enthusiasm show through!
- If you can, include a photo of the proposed site.

Proposal Worksheet

Proposal for a curriculum-based school garden at _____ (school name)

In your proposal you need to show how the school garden will be the milieu where a variety of content standards will be taught in science as well as other subjects. From parts of a plant to ecosystem studies to literacy skills and social studies, you need to show how the school garden provides a natural forum for cross-disciplinary connections, enables fluid learning across the curriculum, and supports a variety of learning styles and abilities. Special Needs students as well as Gifted and Talented groups can all be engaged in appropriate levels of investigations and activities with plants.

Introduction

Opening lines: Begin with a few statements that set a confident tone.

Examples

Imagine a schoolyard garden that students and faculty show off with pride, not only because of its beauty but because it enables a whole new set of learning experiences for students. We can make this vision a reality at _____ School.

_____ School has the potential to enhance student learning outside of the classroom as much as it does inside. A curriculum-based school garden could serve as a living laboratory and outdoor classroom for subjects across the curriculum right in our own schoolyard.

_____ School is attended by children from many ethnic backgrounds, each with distinctive cultural traditions. We would like to celebrate the rich diversity in our school by creating a garden that brings students together to learn about plants from all over the world. In the process, they can participate in activities that increase science knowledge, sharpen math skills, spur literacy and support lessons in geography, writing, and social studies.

Garden Mission, Goals and Objectives

Next, describe your vision for your school garden in 1-2 paragraphs. Then summarize your mission, goals, and objectives. This section can be a direct product of your Vision Meeting.

Where will it be located? How big will it be? Who will work in it? What will be grown? What stories will it tell? How will the children interact in this space? How will parents be involved? How will it improve the appearance of the schoolyard and of the neighborhood?

Refer to Plan for Success in the School Garden Wizard Web site.

Educational Benefits of a School Garden

Provide educational rationale for the project:

- Read through the material about research on learning in school gardens.
- Find details that are most relevant to your school.
- Cite findings about how a school garden can benefit students at your school.

Browse your state's learning standards and select some key standards that might be supported by a school garden.

Garden activities may support general goals, such as finding real-world applications for math exercises at each grade level, or they may serve specific directives, such as providing a location for 5th grade classes to study plant growth.

Be sure to browse through the Web sites to read about how school gardens have enhanced learning at schools similar to yours. Cite these successful schools as examples the value of your proposed garden.

Examples

Now a school garden can transform the schoolyard into an outdoor learning laboratory, essentially a new "classroom" with endless opportunities for investigation and study, for relatively low cost when compared to the costs of constructing a new science lab classroom.

A school garden can be built and used to meet learning standards. Not just content standards but also standards for teaching and instruction that are student-centered involving active investigations that rely on students' own environment as a context for learning.

Refer to Make the Case and Learn in the Garden in the School Garden Wizard Web site.

Plan of Action

Convince your readers that you are aware of the work involved. You do not need to provide all of the answers and you can change your plan as you learn more.

Provide a general plan for getting the work completed:

- Make a realistic timeline that includes general dates for construction, planting, harvesting, and any other significant activities.
- List names of staff and community members who have agreed to actively participate in the project. Include letters of support from them if available.
- Propose a schedule of maintenance that involves classes weeding and watering on a rotating basis or another plan that may work at your school.

Refer to Plan for Success and Create the Garden in the School Garden Wizard Web site.

Funding

Estimate the cost of this project. List some potential ways to raise the money or obtain in-kind donations for equipment, supplies, and plant materials.

Here you may want to show estimates with and without some of the more expensive elements included. Depending on the size, scope, and cost of the proposed garden, you may also want to suggest several phases of construction. Make certain that Phase I is definitely "accomplishable" so that you have a successful initial phase. This will ensure that the project continues.

Again, you need not be specific or commit yourself to anything at this point. The idea is to demonstrate that you are aware of what the project may cost and you are thinking about how you might pay for it. You will learn more about fundraising in another module.

Refer to Plan for Success >> Getting Funds and Supplies in the School Garden Wizard Web site.

Conclusion

Bring the proposal to a close. Write a few sentences restating the mission, goals, and overall benefits of a garden at your school, including the educational value of the garden. Don't forget to remind readers of the long-term benefits of a school garden.