

A Teacher's Guide to a
Sustainable and Educational
Gardening Program

WALLS GARDEN CLUB MANUAL

WALLS GARDEN COALITION

Walls Garden Club Manual

A Teacher's Guide to a Sustainable and Educational
Gardening Program

Community-Based Public Health Practice
Kent State University
Katherine Jaegly

Table of Contents

An Overview of the Walls Community Garden	5
Part 1: Starting a Garden Club	7
The First Five Steps	8
Finding Support, Gaining Interest	10
Obtaining Approval	10
Funding	12
Creating a Timeline	20
Retention	23
Sample Survey	23
Part 2: The Garden	24
Garden Overview	25
Garden Timeline	26
Garden Tools	28
Garden Attire	30
Common Garden Plants and Care	31
Weeds	33
Common Garden Encounters	34
Working With the Community	36
Maintenance of the Garden	36
Emergency Preparedness	39
Injury-Specific Response Plans	41
Part 3: Gardening in the Classroom	46
Inclusion	47
Subject-Specific Recommendations	48
Art	48
English, Reading, or Language Arts	48
Gym	49
History or Geography	49
Math	49
Music	50
Science	50
Lesson Plans	51
Games	53
Exercises	58
Appendix	60
References	61

Walls Community Garden Photographs	65
Activity Worksheets	68
Barnyard	69
Bingo	74
Scavenger Hunt	77
Coloring Pages	83
Lesson Plans	120

An Overview of the Walls Community Garden

Academic performance among youth is an important predictor of adult health outcomes and success. Healthy students are more likely to perform well academically and to maintain healthy behaviors into adulthood. The Walls Garden Club aims to encourage student performance and health through a sustainable gardening program that addresses three key determinants of student health, including nutrition, physical activity, and involvement.

Nutrition

Nutrition is a key indicator of academic performance and mental health. Healthy dietary behaviors and good nutrition have been linked to academic success; conversely, unhealthy dietary behaviors have been linked to obesity and poor mental health outcomes. Students who participate in school-based breakfast and lunch programs report higher test scores, better cognitive function and lower absenteeism. The American Heart Association recommends that children aged 4 to 8 years consume 1.5 cups of fruit and 1 cup (female) to 1.5 cups (male) of vegetables daily to maintain nutritional health. Children aged 9 to 13 years should consume 1.5 cups of fruit and 2 cups (female) to 2.5 cups (male) of vegetables daily.

Physical Activity

It is well-known that physical activity is directly linked to health. However, high levels of physical activity in school are also related to positive academic behaviors such as concentration, self-esteem, memory, test scores, attendance, attention, and verbal skills. Designating additional time for physical activity during the school day has not been shown to harm students' academic performance. Being physically active allows youth to express themselves through social interaction while also promoting healthy behaviors that, performed routinely, carry into adulthood. The World Health Organization global standards recommend that youth aged 5-17 should spend at least 60 minutes per day engaging in physical activity such as play, transportation, recreation, chores, and planned exercise. Currently, only about half of American youth meet this criteria.

Involvement

Research suggests that there is a strong connection between academic achievement and involvement at school, family, and community levels. By working together with their peers, students are able to build diverse, supportive relationships that develop communication skills and promote cultural competence. Involvement of staff in student projects promotes communication and efficiency within the education system while simultaneously fostering trust between students and their teachers. Students with parents who engage in their academic lives have better attendance, social skills, behavior, grades, and graduation rates. In addition to this, partnerships with community members allow access to additional resources and opportunities that promote academic success. Community involvement has been associated with an increase in test scores, grades, and attendance, as well as an improvement in behavior and a decrease in suspension rates.

In partnership with Walls Elementary School, the Kent State University College of Public Health, and the Walls Garden Coalition, the Walls Garden Club seeks to address nutrition, physical activity, and involvement through an interactive and sustainable school and community garden.

This garden will address nutrition by encouraging consumption of fruits and vegetables and by providing easy and constant access to healthy food options. Supplemental activities and programs related to gardening can also be implemented in the classroom to encourage learning and healthy behaviors. Additional materials and lesson plans for garden club meetings can be found in this manual.

Students involved in the maintenance and upkeep of the garden will meet or exceed the daily 60-minute requirement for physical activity set forth by the World Health Organization. Even if students do not partake in maintenance of the garden, time spent outside contributes to this 60-minute goal and increases students' attention, concentration, interest, communication, and test scores. Students involved with the garden program are more likely to build diverse relationships and improve their social skills. In addition to this, community and parent involvement in the garden will provide additional opportunities and resources to aid in the maintenance of student health. The mental and physical benefits of nutrition, physical activity, and involvement, which contribute to academic success and healthy adult habits, are too great to ignore.

A close-up photograph of several small, green seedlings with dark, rounded seed heads growing out of biodegradable, wavy-edged pots. The pots are filled with dark soil and are arranged in a grid pattern. The background is softly blurred, showing more of the same setup.

Starting A Garden Club

Where do you start? How do you plan?

Part 1: Starting the Club

Starting a Garden Club

The current existence of a community garden on school grounds presents a unique and favorable opportunity to forge new pathways to education and health in the classroom. The garden will encourage students, staff, and community members alike to adopt healthy eating behaviors and to develop a strong work ethic. Students will enjoy watching the plants grow, and will be excited when their hard work is rewarded and their plants bear fruit. Staff will appreciate the improvements in academic achievement that coincide with gardening, as well as the opportunity to bond with their students. Finally, community members will enjoy the sense of unity and connectivity that results when the neighborhood comes together. Gardening may be important for personal health, but it has the potential for so much more.

The First Five Steps

As the new school year approaches, it is important to encourage involvement and participation in gardening so that you can generate an interest in a garden club. After you have generated interest, begin planning for the first garden club meeting. There are five (5) general steps to follow to get the club running at the start of a new school year:

1. Gain interest in the club and rally support.
 - a. What age group will the club target?
 - b. What does this group value?
 - c. How do you encourage student, staff, and parent involvement in the club? How do you encourage community engagement?
 - d. How do you market the club to the principal? The superintendent? What topics do these people think that this club should target?
2. Obtain approval to host the club. Communicate with Walls administration to confirm that the club is allowed on school grounds.
 - a. Where do you plan to host the club? Are you allowed to host the club in this location?
 - b. What time do you plan to host the club? Do you have permission to host the club at this time?
3. Secure a source of funding for the club.

- a. How do you intend to pay for activities? Where will this funding come from?
4. Create a calendar for the club and plan for the first meeting.
 - a. When should the first meeting be held?
 - b. How often should the garden club meet?
 - c. What activities will you include in the meetings?
 - d. What special events will the garden club host?
5. Focus on the retention of involvement to keep students interested in the club.
 - a. What are the students interested in? Staff? Parents? Administration? Community members? How can these interests be addressed during club meetings, or in the classroom?
 - b. Are the club members learning from the club? Are they having fun?

The following pages cover these five steps in more detail and suggest solutions to each.

The First Five Steps

Step 1: Finding Support, Gaining Interest

Step 2: Obtaining Approval

The first step to establish a garden club includes building interest in the club. Not only is it important to encourage student participation in the club, but efforts should also target faculty, parents, and community members. All four of these groups will play a significant role in the community garden, and it is important to take their ideas into account.

1. Faculty members will schedule and run garden club meetings. Administrative members, such as the superintendent and principal, will help determine where meetings can be held, as well as what should be discussed. The more that faculty work together, the less stressful this task will become.
2. Parents are responsible for transporting students to and from school grounds. Ask parents what time is best to hold garden club meetings. Parents are also responsible for students' health when at home. Determine what healthy habits are most valued by parents, and choose activities that encourage these habits.
3. Community members will be working alongside students in the garden. Ask if there are tasks that students can help out with.
4. Students are the most important part of garden club! Without student participation, there would be no club. Ask students what they want to learn about, and tailor lessons and activities to match. This will keep students interested and ensure that they return to meetings in the future.

In getting the support of faculty and administration, one also obtains approval for the club. If these key people are on your side, then they approve of a garden club and want to help you set your plans in motion.

There are many methods that can be used to determine interest in a garden club. Surveys offer a direct line of communication between club organizers and potential participants. Survey questions should focus on participant availability and interests. By hosting events, garden club organizers can include potential participants in activities, lessons, and games that are relevant to the topics that will be covered in the club. Events should focus on one or more of the following topics: nutrition, physical activity, involvement, academics, and gardening. Finally, bringing garden-related lessons into the classroom can show students why gardening is important and trigger their desire to learn more. More ideas on gardening in the classroom can be found on page 47. The following table suggests how to attract potential garden club participants by group.

INTEREST BY POPULATION

How do you target specific populations to gain interest for the garden club?

Student Interest	Staff Interest
<p>In-Class Surveys</p> <ul style="list-style-type: none"> • Are students interested in the garden? • What would students want to learn about in the club? • What vegetables should be planted? Fruits? Flowers? <p>Lessons</p> <ul style="list-style-type: none"> • Include the garden in daily curriculum. • Visit the garden during recess and study breaks. <p>Events</p> <ul style="list-style-type: none"> • Plan fun events for students that bring gardening into the classroom. <p>Games</p> <ul style="list-style-type: none"> • Play fun, easy, interactive garden club games in the classroom. If students like the game, then they will want to play it again! 	<p>KEY: Word of Mouth! Discuss the club with your peers.</p> <p>Staff Meetings, Lunch Breaks</p> <ul style="list-style-type: none"> • Pitch the idea to all faculty at the same time. • What are the academic benefits of gardening? • How can gardening be included in the curriculum? Why is gardening important for students? For staff? <p>Email</p> <ul style="list-style-type: none"> • Survey for interest. • When is the first meeting? • What do you need help with? • What are the benefits of gardening, and why should people care? <p>Events</p> <ul style="list-style-type: none"> • Suggest games and activities that can get students engaged and learning in the classroom.
Parent Interest	Community Interest
<p>PTA Meetings</p> <ul style="list-style-type: none"> • Are parents interested in a garden club? Are they supportive? • What topics would they want a garden club to cover? <p>Parent-Teacher Conferences</p> <ul style="list-style-type: none"> • When is it convenient for students to attend garden club? <p>Take-Home Handouts and Flyers</p> <ul style="list-style-type: none"> • What are the goals of a garden club? What will the club do? When? How? • Advertise upcoming garden club meetings and activities. • What are the health benefits of gardening? Academic benefits? 	<p>Flyers, Brochures, Advertisements</p> <ul style="list-style-type: none"> • Advertise the garden. • Seek out professionals who want to share their knowledge with students. • Inform the public on the benefits of gardening and healthy habits. • Invite community members to events and fundraisers. <p>Events</p> <ul style="list-style-type: none"> • Network with local organizations, clubs, and businesses. • Seek out parties that are willing to donate. <p>Town Hall Meetings, City Meetings</p> <ul style="list-style-type: none"> • Network with city officials and community members. • Seek grants and donations for funding, if needed. • Seek service learning opportunities.

The First Five Steps

Step 3: Funding

How do you intend to pay for the materials that are needed for club activities?

Funding is essential to the success of any school club. Luckily, many of the materials that you may need should already be found on school grounds. Craft supplies, such as pencils, pens, crayons, markers, and paper, can all be used to supplement club activities.

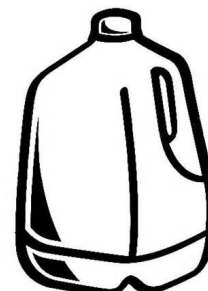
Gardening tools, which will be necessary for garden planting and maintenance, can already be found in the greenhouse. Finally, many games and exercises can be played without any extra materials.

This does not mean that a garden club will be completely free, however. What if extra materials are needed for an activity or project? What if the club wants to host an event? Fortunately, there are multiple ways to keep expenses at a minimum and ensure that materials are affordable. Common sources of funding may include donations, fundraisers, and out-of-pocket spending.

COST-SAVING TIPS

Upcycling or using recyclable materials can help offset cost!

- Plant seeds in empty toilet paper rolls or recycled milk cartons from lunch periods. Transfer to the garden once the plants are strong enough.
- Use empty gallons of milk as watering cans, and refill them when needed. 2-Liter bottles can also be used for this purpose.
- Cut the handle off of empty gallon milk cartons to use as shovels in the garden.
- Create labels for what you have planted using popsicle sticks or painted rocks.
- Recycle coffee cans into birdhouses by cutting holes in the lids.
- Use teacups as bird feeders by filling them with birdseed.
- Use old tires as planters or stools. Paint for decoration.
- Paint golf balls and use them to label plants in the garden or to separate garden plots.
- Old colanders can be painted and used as planters.
- Hang garden tools from hangers or pallets.
- Use old baskets to create “gardening toolkits” that students can carry with them when working in the garden.



Garden Donations

Club events can become expensive, and funding is needed to help cover the cost. Donations from students, parents, community members, and local organizations or businesses can help lower club-related costs.

The parent-teacher organization at Walls Elementary School is a valuable resource. Parents come from a variety of diverse backgrounds, and their connections and experience can open multiple new pathways of communication. If a parent themselves is not able to help with the club, they might be able to contact someone else who can. Reach out to parents--they want their students to benefit from the club, and will be happy to help.

When looking for materials for garden club events and activities, it is also important to reach out to the community. Many local organizations and companies are more than willing to help fund community and school initiatives. Be knowledgeable about the companies you ask to donate, and do research beforehand to prepare.

When reaching out, explain the purpose of your club and what you hope to accomplish.

1. How do the community garden and garden club benefit the students at Walls Elementary School? The public?
2. Why is it important for students to garden at a young age?
3. What will the students learn from the activities and events held by garden club?
4. How can local companies benefit?
5. What will donations be used to accomplish? Why is this good for the community?

Approach local businesses, as well as national chain companies. Partner with companies, coalitions, and governmental organizations. The City of Kent will support community and school initiatives, while grocery stores such as Acme might donate food or gift cards. Remember, when in doubt that an organization will donate, it never hurts to ask!

The following page lists examples of local, regional, and national companies that accept donation requests.

DONATION TIP

Searching “[City/State/County] Donation Request” will offer results for location-specific donation request forms.

To view an online donation request form, please click the **links** to the right.

LOCAL DONATIONS

- Culligan Water services communities in Akron and Canton. File an electronic donation request at <https://culliganakroncanton.com/donation-requests>.
- The Off the Wagon Shop in Kent, Ohio supports local initiatives. Fill out a donation request at <https://www.offthewagonshop.com/pages/local-donation-form-request-kent-ohio>.
- Insomnia Cookies will donate cookies or gift cards for your event. Donation requests can be filed at <https://insomniacookies.com/donations>.

REGIONAL DONATIONS

- The Holden Arboretum will support sustainable, green initiatives. Donations can be requested using the following donation request form: <https://www.holdenarb.org/about/charitable-donation-request/>.
- The Oriental Trading Company will donate events to public schools for events, raffles, and auctions (as well as other activities). To fill out a donation request form, please visit <https://orientaltrading.requestitem.com/>.
- The Ohio State Fair will donate tickets to your fundraising events. The donation request form can be found at <https://ohiostatefair.com/donation-requests/>.
- The African Safari Wildlife Park in Port Clinton, Ohio will donate park passes in exchange for marketing on printed materials at your event. To request a donation, please visit https://www.africansafariwildlifepark.com/public/donation_requests/.

Garden Fundraisers

A second option for funding is to host a club fundraiser. Fundraisers can be extremely simple, or can be complex; they can last for a longer period of time, such as a week, or a single day. In summary, there are a lot of fundraising options. Choose the fundraiser that is right for you. Check out some of the cool fundraising options listed here!

FUNDRAISING IDEAS	
Remember to be creative with your fundraising! Think outside of the box! These are only a few fundraising ideas, so feel free to come up with your own.	
Plant or Produce Sale	Have students grow plants, fruits, and vegetables. Sell them at the end of the year.
Garden Club Cookbook	Students collect healthy recipes using fruits and vegetables. Collect the recipes and make a cookbook to sell at the end of the year.
Penny Drive / Quarter Mile	Collect spare change. Set a goal to reach (ex. Collect enough quarters to span the length of the parking lot) or turn the fundraiser into a competition to see who can collect the most.
Dress Down / Up Day	Do students have a uniform at school? Let them pay to dress casually for the day. If there is no uniform, then students can pay to dress fancy or in costume.
Movie Night	Sell movie tickets and screen a film at the end of the week.
Community Yard Sale / Junk Donations	Collect donations from the community and have a large, community-wide sale to raise funds for the club.
Craft Show	Have garden club students make crafts to sell at a craft show.
School Carnival / Dunk Tank	Host a carnival with games and activities.

	Sell tickets, snacks, and drinks to raise money. A dunk tank could be a neat idea, too--students can pay to dunk a teacher.
Car Wash / Pet Wash	Students, staff, and parents help wash cars or pets to raise funds.
Can / Bottle / Recyclable Materials Drive	Collect cans, bottles, and other recyclable materials to use in club activities or to raise funds. Turn this drive into a competition to see which class can recycle the most cans, etc.
Holiday Candygrams / Flower Sale	Sell flowers or candies. Allow students to purchase candygrams for their friends, and distribute them on holidays. Flowers could be sold for Valentine's Day, candy for Halloween, candy canes for Christmas, etc. Attach a friendly message and you're good to go!
Bake Sale	Students can prepare and sell baked goods.
Lemonade Stand	Students can prepare and sell lemonade.
Rubber Ducky Race / Raffle	Number and sell rubber ducks. After a time, hold a drawing (such as a 50/50) to determine a winner. (In this case, substitute rubber ducks for raffle tickets.) You could also release ducks into a body of running water and make them "race," where the first duck that crosses a "finish line" wins. However, you would need to make sure that you remove the ducks from the water and do not leave waste.
50/50 Raffle Tickets	Sell tickets and draw a winner.
Restaurant Fundraiser (5 Guys, Panera, etc.)	Partner with a restaurant so that over a certain period of time, a percentage of their profit benefits garden club.
Donation Jars	Set up donation jars in local stores and businesses to collect spare change for the club.

Paper Airplane Toss	Host a paper airplane competition, and collect an entry fee. Students can build airplanes and compete in a tournament to see which airplane goes the farthest.
Walk-a-Thon or Dance-a-Thon	Have students walk or dance to collect money from “sponsors.”
Pancake Breakfast	Sell tickets to a pancake breakfast. Serve food and play games.
T-Shirt Sale	Create Walls Elementary or Walls Garden T-Shirts and sell to garden club members or community members who have rented plots in the garden.
Art Gallery	Have students create and display art pieces. Sell tickets at the door and make it a fancy event.
Trivia Night or Bingo Night	Sell tickets to this event or host a raffle at the event.
Floating Lantern Release / Sparklers / Glow Stick Dance (“Night Lights” Events)	Host a nighttime event. Allow parents and students to release floating lanterns (for a fee) or play with sparklers (again, for a fee). Make sure there is adequate supervision. A glow stick dance is another option; sell tickets to the dance and allow students to bring friends or family members.
Father/Daughter and Mother/Son Dance	Sell tickets to the dance. Serve snacks and drinks, and maybe host other activities.
Dish Smash	Collect donations of old glassware and allow students or other community members to smash them. Ex. Smash 1 plate for \$1. This could be potentially dangerous with younger children, so plan accordingly and exercise caution.
Color Run	Host a “color run” where runners are covered in paint, silly string, water+food coloring, colored powder, etc. on their route. Collect an entry fee from runners.

Community Clean-Up Day	Coordinate volunteers to help pick up trash and debris, plant seeds, dig, build, etc. Afterward, hold a celebration to thank the volunteers. Sell T-Shirts, food, etc. at this event.
Petting Zoo	Have students and parents volunteer their pets to take part in a supervised "petting zoo." People can pay to enter the "zoo" and pet all of the dogs, cats, hamsters, rabbits, etc.
Box Tops	Collect box tops to raise funds for the club and the school.
Breakfast with [Character]	Host a breakfast event and sell tickets to attend. Volunteers can dress up as different characters and students and their families can eat and visit. For example, you could host "Breakfast with the Disney Princesses" and ask volunteers to dress up as Cinderella, Belle, Snow White, etc. Other examples include dressing like historical figures or in traditional cultural outfits, which could make the event more educational.

Out-of-Pocket Spending

The last funding option for garden club is out-of-pocket spending. If donations are not made and fundraising does not cover cost, students may have to bring the materials or money needed for their own activities. In the Walls Elementary School environment, it is highly unlikely that costs will ever grow this high; however, it is always an option. Be careful to plan events on a budget and to request donations or host fundraisers before opening your own checkbook.

FUNDING TIP

At this point in time, the garden club is relatively new. Expenses might seem a bit higher than normal. If you need extra equipment that cannot already be found on site, it is likely that you will only have to purchase it for this first year. Afterward, you can re-use your materials for future club meetings, activities, and events.

The First Five Steps

Step 4: Creating a Timeline

Before starting a garden club, it is important that you have enough time for it. Students, staff, and parents all need to know when club meetings will take place, where, how often, and how long. Answer these questions in advance, and set up a tentative schedule to plan ahead for the school year.

Surveying student, parent, and staff availability could be a very helpful task to determine when to hold meetings. This way, you can see when students want to have meetings, and when parents are available to drop off and pick up their children. Noting when staff are available to help run the club can also influence the schedule.

A GARDEN CALENDAR

Not only should plans be made for garden club meetings, but you should also plan ahead for garden maintenance. Check out **Oregon State University's Monthly Garden Calendars** for key dates for fertilizing, planting, pest control, and maintenance.

JAN - FEB - MAR - APR - MAY - JUNE - JULY - AUG - SEPT - OCT - NOV - DEC

Click a month to get started!

There are four essential questions to answer before hosting the first Garden Club meeting:

1. How often would you like to have meetings?
 - a. Will meetings be held daily? Weekly? Bi-weekly? Monthly?
 - i. It is recommended that meetings be held at least twice a month so that students are constantly engaged with the club. Make sure that the club is constantly supported in the classroom, but that there is a balance between the club and other outside commitments. If you hold meetings too often, you risk running out of activities. Likewise, if you don't hold meetings often enough, you risk students losing interest in the club.

2. When are meetings going to be held?
 - a. Will you meet before school? During school? After school? During lunch, or an advisory period? On weekends?
 - i. First, determine when there are other activities going on. You do not want garden club to conflict with other events or clubs. Next, determine when students are available to participate. Are they willing to stay after school, or to come in before class? Is there a time of day when everyone is available, such as a lunch period? How much time do you have for activities if you choose to meet at this time of day?
3. Where do you plan to meet?
 - a. Will you meet in a specific classroom? In the library? In the lunchroom? In the gym?
 - i. One suggested meeting place is the new Makerspace in Room 104. This is a perfect location for students to be creative and involved. If you choose to meet here, when is it available? Is there a time when someone else is using it?
4. How long do you plan to meet?
 - a. When you hold a meeting, how long will it take? One hour? One and a half? Two?
 - i. Take into consideration how often you plan to meet. If you meet daily, you might take less time per meeting (ex. 30 to 45 minutes). If you meet weekly or bi-weekly, the meetings might be longer (ex. 1 to 1.5 hours). Monthly meetings would likely be the longest (ex. 2 hours or more).
 - ii. Consider meeting place. How long is it available? Do you have to leave at a certain time? Are there other time restraints?
 - iii. Finally, take into account the activities that you hope to perform. How long will they take? How much time do you have, and how much time will you need?

You should also figure out how you plan to distribute the schedule to students, parents, staff, and community members. Will you send emails? Print flyers? Tell them in person? Use social media?

A General Meeting Layout

The Walls Garden Club seeks to encourage student performance and health by addressing three key determinants of health: nutrition, physical activity, and involvement. For this reason, it is suggested that a general garden club meeting include all three of these components, or at least two of the three.

THE PERFECT MEETING RECIPE	
(1) Nutrition-Based Component + (1) Physical Activity-Based Component + (1) Involvement-Based Component = A Garden Club Meeting	
Nutrition	<p>A healthy snack, recipe, or environmentally-friendly task to do at the meeting or to take home.</p> <ul style="list-style-type: none"><input type="checkbox"/> Snack<input type="checkbox"/> Recipe<input type="checkbox"/> Garden Task
Physical Activity	<p>A game to play, a scavenger hunt, an exercise, or time spent outside in the garden.</p> <ul style="list-style-type: none"><input type="checkbox"/> Game<input type="checkbox"/> Active Activity<input type="checkbox"/> Exercise<input type="checkbox"/> Garden Maintenance<input type="checkbox"/> Time Outside
Involvement	<p>Any activity that encourages teamwork, communication, and relationship-building. Something to help the environment or the school.</p> <ul style="list-style-type: none"><input type="checkbox"/> Game<input type="checkbox"/> Garden Maintenance<input type="checkbox"/> Partner Work
NOTE: Notice that there is some overlap in activities for these three components. This makes it easier to cover all three at each garden club meeting. In addition to this, these activities are broad, and can be tailored to each individual garden club lesson.	

The First Five Steps

Step 5: Retention

At this point, you have rallied support for the club, obtained approval from administration, set the date and location of the first meeting, and secured funding as needed. Yet, none of this matters if the students lose interest in the club. How do you keep students and staff interested in the garden club and its activities? How do you keep them involved?

The solution is quite simple: if people enjoy what they do at garden club, then they will continue to participate. Make sure that your chosen activities are based on the wants, needs, and interests of the students who are involved. Target all age groups and grade levels, and invite community members and parents to join in.

The most direct way to determine individual interests is to survey your students. What do they like about garden club? What didn't they like as much? What did they find really interesting, and what do they want to learn more about? At the end of every meeting, try to review the day's activities. Use the Thumbs Up activity on page 57 to turn this into a game, or distribute a survey at the end of each meeting. A sample survey is shown below.

Activity Survey

1. Did you like the activity today? YES or NO
2. What did you like the most?
3. What did you like the least?
4. Did you learn something new? YES or NO



The Garden

Part 2: The Garden

A Gardening Overview

The term “garden” is fairly broad, as gardens themselves come in many shapes and sizes and can exist in a plethora of locations across the globe. Likewise, garden plants are extremely diverse and serve a multitude of purposes. Some, like flowers, are ornamental, and are planted simply to be used as decoration. Others are grown for consumption, and are eaten. Further still, plants set the foundation for many of the products and benefits that we take advantage of on a daily basis, including makeup, medicine, tobacco, clothing, furniture, and heat.

Gardening is rooted (no pun intended) in human history, dating back to the 1500s and beyond. As incoming settlers introduced new plant species to the Americas, the gardening practice became more common and more complex. Gardens were not only used as a means of survival; rather, a study of their history shows a transition from vegetable gardening for consumption to recreational gardening of flowers and decorative plants. During World War 1 and World War 2, gardens were grown to support the American war effort and to produce food. Today, urban community gardens are seemingly becoming a smart and environmentally healthy alternative to commercially-grown and genetically altered food.

GARDEN TIP: Gardening and History Lessons

- ❑ Spend a day discussing a brief history of gardening in the United States. Choose an event of important gardening significance, and relate this event to the Walls Community Garden. Make connections between the current garden and gardens of the past.
- ❑ Choose a significant figure in garden history. How would the Walls Community Garden be different if this figure had not made their historic contributions to gardening?
- ❑ Take a field trip to a historic gardening location. Some locations also offer virtual tours online for free.

The Garden Timeline, adapted from a Smithsonian Gardens presentation on American Garden History, further explains key events in gardening history. More information can be found at <https://prezi.com/h2wrcynhasgi/american-garden-history/>.

A GARDENING TIMELINE

- 1565 The Spanish bring plants from Spain and the West Indies to St. Augustine, Florida.
- 1607 People settling in Jamestown, Virginia begin to grow tobacco.
- 1619 As slavery becomes more common, slaves establish their own small gardens.
- 1620 Pilgrims arrive in New England and bring seeds with them.
- 1629 As the Dutch settle in New York, they introduce European flowers to the climate. They also establish orchards and farms.
- 1638 New England gardens are known to contain apple, pear, plum, English Yew, European snowball, lilac, and boxwood.
- 1639 Settlers in the Jamestown colony are required by law to plant orchards and gardens if they own over one hundred acres of land.
- 1640 America's first public park, Boston Commons, is established.
- 1737 Robert Prince establishes the first commercial nursery in Flushing, New York.
- 1741 America's first landscaped garden, Middleton Place, is built in Charleston, South Carolina.
- 1790 People begin to separate flower gardens and vegetable gardens. Flowers are used as decoration around the home.
- 1802 The first seed and florist shop is opened in New York City by Grant Thorburn.
- 1820 Congress establishes the United States Botanical Garden in Washington, D.C.
- 1858 Central Park is commissioned in New New York, New York.
- 1861 The Civil War begins, devastating southern plantations.
- 1872 Yellowstone Park is established. It is the first National Park of the United States.
- 1876 The Horticultural Hall at the Centennial Exposition in Philadelphia displays exotic garden specimens.

- 1878 W. Atlee Burpee Seed Company is founded. This mail-order seed company would later become the largest one worldwide.
- 1891 The first women's gardening society, the Ladies Garden Club of Athens, is established in Georgia.
- 1900 The first academic program to target landscape architecture is established at Harvard University.
- 1903 The City Beautiful Movement encourages city planning and city gardens.
- 1910 From 1900 to 1910, school gardens become popular in the United States.
- 1913 The Garden Club of America is founded.
- 1917 In the midst of World War 1, Americans practice "war gardening" to support the war effort.
- 1918 The Plant Quarantine Act restricts importation of foreign plants and seeds to stop transmission of plant diseases and pests.
- 1922 The American Horticultural Society is founded.
- 1942 Victory gardens are planted from 1942 to 1945 to aid in the World War 2 war effort. At the same time, Japanese prisoners in internment camps also plant their own victory gardens.
- 1970 Earth Day is celebrated for the first time.
- 1973 Congress passes the Endangered Species Act to protect at-risk plants and animals.
- 2000 Urban community gardens become popular once more.






Source: Smithsonian Gardens. (2014, August 14). *American garden history* [Prezi Presentation]. Retrieved April 2, 2019, from: <https://prezi.com/h2wrcynhasgi/american-garden-history/>

Garden Tools

The Walls Community Garden was established in 2018, and many of the tools and materials that are needed for garden maintenance will already be available for use. These will likely include shovels or trowels, gloves, watering cans, wheelbarrows, garden hoes, rakes, shears, and other pieces of equipment.

Common garden tools may include the following:

- Shovel
- Spade
- Trowel or Transplanter
- Rake
- Fork
- Garden Hoe
- Mattock or Pick
- Cultivator
- Post Hole Digger
- Weed Whacker or Grass Blade
- Hose
- Watering Can
- Edger
- Bush Axe
- Digging or Tamping Bar
- Bulb Planter
- Weeder
- Shears
- Wheelbarrow or Plastic Yard Cart
- Gloves
- Knee Pads

Shovel		
Round Point	This is a great tool for digging, lifting and throwing. The round point cuts into the soil. The rim on the top of the shovel blade allows added foot pressure for digging holes.	
Square Point	This is excellent for moving materials. The larger size is known as a scoop.	
Spade		
Garden	This is similar to a square point shovel, great for digging, cutting, edging and lifting sod.	
Drain or Trench	This has a narrow head and straighter handle for working in restricted spaces. Also used for transplanting.	
Roofing	Though not a garden tool, it is often found in the garden section. The serrated head is made to rip and lift roofing shingles.	

Source: Lowes (2019).

Please note that not all of the tools listed above will be on site at the Walls Community Garden. For more information on common garden tools and their use, please consult the **Lowes Garden Tools Buying Guide**.

Depending on what plants are growing in the garden, students may encounter a number of garden tools; however, it is likely that they will only use a fraction of what is available. Elementary-age students will be expected to use shovels, gardening gloves, and watering cans to maintain their garden plots. They may also shovel dirt or transport materials from one place to another.

GARDEN TIP: Garden Toolkits

Encourage all students to get excited about garden club by making individual garden toolkits! Fill a basket with garden supplies. When it is time to work in the garden, students each have their own tools in their own basket! Supplies can include:

- Pair of Gloves
- Hand Shovel or Trowel
- Small Watering Can (Note that a water bottle can also be used.)
- Additional Tools, As Needed

In addition to garden tools, it is also a good idea to obtain the following:

- Trash Bags: to collect waste.
- Scissors: to open bags or cut weeds.
- Water Bottles: to stay hydrated while working outside.
- Emergency First Aid Kit: in case of an emergency.

A Note on Garden Tool Safety

Safety is a priority when working with any garden tool. Please remember to use judgement when working in the garden, and to supervise students at all times. Accidents can be dangerous and potentially life-threatening. Younger students should not be trusted with dangerous gardening tools or equipment. Likewise, older students should be carefully monitored when using equipment. It is recommended that the following steps be taken before allowing students to work in the garden:

- An initial garden club meeting should be held to discuss proper use of gardening equipment. Students should be familiar with garden tools and their use before entering the garden.

- Garden club leaders should discuss emergency response in advance so they know what action to take if something goes wrong.
- Students should be advised to ask permission to use a tool before they are allowed to have it. In other words, students should not be able to choose tools at random.
- Remember, if students are not on their best behavior, they should not be allowed to wield a tool. If they play with the tool or misuse it, they are a threat to their own safety and to that of others.
- Students should not be allowed in the garden unattended, especially if there are tools in use.

Make sure that you have emergency contact information for all students who will be working in the garden. Notify parents and guardians if there is an emergency. Ensure that there is adequate adult supervision at all times. Overall, please use judgement and common sense when in the garden and when using garden tools. To learn more about emergency preparedness and garden safety, please visit page 39.

Garden Attire

When working in the garden, it is important to dress comfortably and safely. Prepare to get dirty, and wear clothing that is easily washable. Tennis shoes or closed-toe shoes are preferred in case of emergency. Finally, wear gardening gloves (if available) to protect hands from scrapes, pokes, and dirt.

Encourage students to bring a change of clothes if getting dirty is of particular concern.



Common Garden Plants and Care

Gardens are very flexible. That is, there is a variety of fruits, vegetables, herbs, flowers, and other plants that can be grown under the right care and commitment. Before planting, however, one must first decide what it is they would like to grow. What should be planted? When should it be planted? Where should it be planted? How do you maintain it?

GARDEN TIP: Common Definitions

Before you answer these questions, it might be helpful to consider the following definitions:

- **Annual:** A plant with a life cycle of one year. Once planted, it will not return for a second growing season.
- **Perennial:** A plant with a life cycle of more than one year. Once planted, it will bloom again during the next growing season.

It is recommended that the club use annual plants in their garden plots, so they have room to plant a new variety of herbs, fruits, vegetables, and flowers next year.

There are two garden plots set aside in the Walls Community Garden for the club to use. It is up to the members of garden club to determine what it is they would like to plant. Consider the ideal maintenance regimen and climate for each plant to determine what would grow best in your garden. Common garden plants are listed in the table on the next page.

COMMON GARDEN PLANTS

Click on a specific plant from the lists below to learn more about when to grow it, where to grow it, and how to care of it.

FRUITS	VEGETABLES	HERBS
Apple Apricot Blackberries Blueberries Cherry Fig Gooseberries Grapes Melon Peach Pear Plum Raspberry Rhubarb Strawberry	Artichoke Asparagus Bean Beet Broccoli Brussels Sprouts Cabbage Carrot Cauliflower Celery Corn Cucumber Eggplant Kale Lettuce Onion Parsnip Pea Pepper Potato Radish Spinach Squash Sweet Potato Tomato Turnip Zucchini	Basil Chives Dill Garlic French Tarragon Mint Oregano Parsley Sage Thyme
FLOWERS	There are a very large selection of flowers to choose from. Visit the National Gardening Association website for more information and ideas.	

Plant-Specific Tips for Starters

1. Tomatoes

Tomatoes are easy to grow and to maintain. They also produce a lot of fruit. This would be a good choice to start the garden club, and as students gain more experience with plants they can experiment with more complicated produce.

2. Peppers

Peppers are also easy to grow and maintain. No matter the type of pepper, it can be eaten when green; as the peppers mature and change color, they become sweeter.

3. Cucumbers

Cucumbers are not hard to grow, but they do take moderate work to maintain. Use stakes to ensure that the cucumber plant does not sprawl outward, but rather grows upward. If done correctly, the cucumber yield will be high.

4. Mint

Mint would not have to be planted with the other plants in a large garden, but could instead occupy a small pot. Regardless, this could be a more interactive herb to plant, as the students would likely enjoy the smell of the mint leaves.

Handling Weeds in the Garden

A garden can be home to many beautiful and desirable plants. Unfortunately, it can also become home to a number of weeds. It is important to remove weeds because they take the valuable nutrients and water away from what has purposefully been planted. The sooner you work to destroy the weeds, the easier it will be to remove them. However, it may be easiest to prevent them from growing in the first place.

There are many methods that can be used to prevent weed growth. First, a barrier can be used to block weed access to sunlight. A three-inch layer of mulch, straw, or even wood chips can be spread to impede growth. Weed killers are perhaps the most effective solution, but can be unpredictable; if used, they might kill other plants, too. Finally, weeds can be dug out with a shovel or a hoe. There are additional garden tools that can be purchased specifically for this purpose, if desired.

To learn more about weeds and weed prevention, check out **this HGTV compilation** of articles.

Common Garden Encounters

The community garden at Walls Elementary is located north of the school, across from the parking lot. It is surrounded by a thick wall of trees on two sides, which separate it from the neighborhood beyond. It also borders the parking lot itself. Because it is surrounded by such green space, however, humans may not be the only creatures that visit the garden.

When students go outside to garden, they may encounter a number of common animals who also seek to use the green space. These may include insects, birds, small mammals (such as rabbits or squirrels) and large mammals (such as fox and deer). Although the garden itself is surrounded by a fence to keep these animals out, this does not mean that these creatures will not be attracted to the garden or to the space around it.

When gardening, please be conscious of the environment around you. If there are animals in the green space, take the following precautions:

1. Do not try to provoke any animals; rather, leave them alone.
2. Do not touch or chase animals.
3. Avoid feeding animals. Pick up trash after completing garden activities.
4. Do not pick up insects, and resist the urge to squish insects.

Overall, be kind and courteous to these creatures. The garden is their home, and as

INSECTS

Ant
Aphid
Bee
Beetle
Butterfly
Caterpillar
Dragonfly
Earthworm
Earwig
Fly
Grasshopper
Ladybug
Moth
Praying Mantis
Slug
Snail
Spider
Stink Bug
Wasp

For more information on insects, please visit the Amateur Entomologists' Society collection of **Insect Groups**.

BIRDS

Blue Jay
Cardinal
Crow
Finch
Hawk
Hummingbird
Pigeon
Robin
Sparrow
Swift
Woodpecker

For more information about bird species, please visit the **Cornell Ornithology Online Bird Guide**.

guests it is important to treat their home with respect.

For more information on common garden critters, please check out this HGTV list of **16 Common Garden Pests** and the Royal Society for Protection of Birds' **Wildlife Guides**.

Search **National Geographic** for specific animal facts.

MAMMALS

[Bat](#)
[Chipmunk](#)
[Deer](#)
[Fox](#)
[Groundhog](#)
[Mole](#)
[Mouse](#)
[Rabbit](#)
[Squirrel](#)

Click on any link above to learn more about that creature!

Wildlife Emergencies

When in the field around other creatures, there is always a risk of a bite or sting. If the issue is not serious or life-threatening, consult the first aid kit. In the case of a wildlife emergency, such as excessive bleeding, swelling, or allergic reaction, call 911 and seek further medical attention. Collect emergency contact information in advance and notify parents if there is a life-threatening emergency. For more emergency information, please visit page 39.

Gardening Maintenance

What is expected of students when they are working in the garden? How will garden work be split between students and other community members? What is proper garden etiquette?

Working With the Community

There are two garden plots set aside specifically for student use. While students may plant and maintain whatever they choose in these plots, it can also be recommended that students help out with the general maintenance of shared community spaces in the garden. These spaces might include walkways, greenhouse storage, and surrounding green space (the field and parking lot).

When working in the garden, it is especially important that the club is respectful of other community members' plots and plants. While students should be encouraged to help other gardeners as needed, they should be reminded to ask permission before taking action. This does not mean that the garden club should refrain from interacting with the public, however. Students can make sure that the garden is clean and organized, and can assist in the creation of a welcoming and sustainable environment.

WHEN WORKING IN THE GARDEN, REMEMBER TO...

- Be mindful of other community members and their garden plots and tools.
- Do not tamper with garden plots that are maintained by other community members.

Maintenance of the Garden

Students will most often be involved in the upkeep of the Walls Community Garden. This includes maintenance of 2 key garden components: appearance and plant life.

When targeting garden appearance, students should focus on keeping shared spaces clean and organized. By making sure that everything is clean, students ensure that the garden is functional and profitable.

The checklists below suggest tasks for garden club members to complete when in the garden. Listed are general garden club tasks of community benefit, which target shared spaces, as well as club-specific ideas. A further list of activities, exercises, and games can be found on page 53.

In addition to maintaining the two club garden plots, students might:

- Keep shared spaces clean. Make sure that walkways are not obstructed by debris or trash.
- Pick up trash or recyclable materials and dispose of them as necessary.
- Help out with garden repairs and tasks as needed.
- Make sure the greenhouse is clean and organized.
- Label plants in the garden.
- When working in the garden with other community members, engage in conversation and ask questions to make community members feel welcome.
- Distribute water bottles to community gardeners on hot days. To turn this into a fundraiser, sell lemonade or snacks.
- Encourage community members to attend a garden club meeting and share their gardening tips and tricks.
- Complete other club activities that focus on identification and application of learned knowledge.

When targeting plant life in the garden, students can be involved in the growth and development of garden vegetation. This component of garden maintenance includes the watering and pruning of plants, as well as weeding and the harvesting of fruits and vegetables once they have become ripe.

A NOTE ON WATERING PLANTS

Water is a vital source of nutrients for plant life. Without it the fruits, vegetables, herbs, and flowers that are planted in the garden would not grow. To ensure that the garden plants do not die, it is important that the garden be watered often. This means that, regardless of whether there is a garden club meeting, someone will need to be in charge of watering the plants. Establish a role so that there is someone in charge of this task. While it is recommended that plants are watered daily (especially in hotter weather), it might be adequate to water plants every other day.

Garden club tasks for plant growth in the garden may include the following:

- Water plants every other day or as needed.
- If plants begin to droop, tie them to stakes to prop them up.
- Remove dead leaves.
- Remove weeds, which steal water and other resources from desired plants.
- Pick ripe fruit and vegetables.

Due to weather and time concerns, it can be helpful to start seeds in the classroom instead of directly in a garden plot. Not only is it easier to transport plant sprouts, but in winter months, students can get a jump-start on the gardening process. For more information on starting seed planting in the classroom, please refer to the Kids Gardening **Indoor Seed Starting Q&A**.

Emergency Preparedness in the Field

Regardless of the activity, there is always a risk when working with youth. While working in the garden, it is important to prepare for any number of potential situations. What happens if a child is stung by a bee? If they get a sunburn, cut, or scrape? What will you do if a student becomes dehydrated and passes out, or if they have a severe allergic reaction? Steps may be taken to prevent harm, but sometimes disaster is accidental or unavoidable. If an emergency occurs, it is important that precautions are taken to remedy the situation in a quick and effective manner.

Small injuries, such as cuts and scrapes, are common and will likely occur. While these injuries may not be life-threatening, they may still be a major inconvenience to the student that is hurt. In this case, it would be helpful to have a first aid kit on-site, especially while working outside in the garden. While this can be bought in a store, it can easily be put together at home. An adapted list of first aid supplies can be found on page ____. For a complete and thorough list of supplies, view the **American Red Cross Guide to Making a First Aid Kit**.

As always, if you are unsure of how to handle a situation you should seek help from trained professionals. In life-threatening situations it is best to call 911 and seek further medical attention. In general, “it’s better to be safe than sorry.”

Creating

Your Own

First Aid Kit

Accidents happen. It is best to be prepared.

- 2 5" x 9" Absorbent Compress Dressings
- 25 Assorted Adhesive Bandages
- 1 Adhesive Cloth Tape (10 yards x 1 inch)
- 5 Antibiotic Ointment Packets (Neosporin)
- 5 Antiseptic Wipe Packets
- 2 Packets of Aspirin
- 1 Instant Cold Compress
- 2 Pairs of Large Non-Latex Gloves
- 2 Hydrocortisone Ointment Packets
- 1 Gauze Roll Bandage, 3" wide
- 1 Roller Bandage, 4" wide
- 5 3" x 3" Sterile Gauze Pads
- 5 4" x 4" Sterile Gauze Pads
- Oral Thermometer (Non-Mercury/Non-glass)
- 2 Triangular Bandages
- Tweezers
- Hydrogen Peroxide
- Sunscreen and Aloe Vera
- Scissors
- Flashlight
- Bottled Water
- Cotton Balls and Q-tips

VISIT REDCROSS.ORG FOR A COMPREHENSIVE FIRST AID CHECKLIST.

Injury-Specific Response Plans

HANDLING CUTS, SCRAPES, AND BRUISES

1. Wash the cut with soap and warm water.
2. Apply antibacterial ointment and a bandage.
3. In severe cases with excessive bleeding, apply pressure until bleeding stops. If bleeding is excessive and does not stop, call 911.

HANDLING BLEEDING (SLIGHT)

1. Wash the bleeding area with soap and warm water.
2. Apply antibacterial ointment and a bandage.
3. In severe cases with excessive bleeding, apply pressure until the bleeding stops. If bleeding is excessive and does not stop, call 911.

HANDLING BLEEDING (EXCESS)

1. Call 911 or seek medical attention immediately.
2. Apply pressure to the wound to slow or stop bleeding.
3. While still applying pressure, elevate the bleeding limb above the heart.
4. If necessary, apply a tourniquet to the wound. **ONLY APPLY A TOURNIQUET IN CASES OF EXTREME EMERGENCY.**
5. Keep applying pressure to the wound until medical help arrives.

TOURNIQUET APPLICATION

A tourniquet works by squeezing large blood vessels to stop blood loss. Tourniquets should only be used in cases of severe bleeding where other methods to stop bleeding have been unsuccessful. Apply direct pressure to the wound for at least 15 minutes before attempting a tourniquet.

If possible, wear gloves or other personal protective equipment when working with large amounts of blood.

Tourniquets can be constructed with most available materials, including shirts, belts, bandages, and strips of cloth. Materials should be 2 to 3 inches wide to prevent further damage to the bleeding area. They should also be long in length.

1. Call 911.
2. Remove clothing from the bleeding area so that it will not obstruct the tourniquet.
3. Tie tourniquet material 2 inches above the wound over a long bone. Do not tie over a

- joint (such as an elbow or knee). Do not use a tourniquet on a neck or torso.
4. Insert a long item, such as a stick, into the tied knot. Tie the tourniquet material over the item into a knot to secure it.
 5. Turn the item to tighten the tourniquet until the pulse below the tourniquet cannot be felt.
 6. Use a second piece of material to secure the tourniquet in place.
 7. On the person's body, write the time that the tourniquet was applied. If you lack a pen or marker, write this time in blood. This is critical for emergency responders to use later.
 8. Check the arm or leg every 2 hours for additional bleeding, swelling, or muscle stiffness.
 9. Do NOT remove the tourniquet until professional help is available.

For a step-by-step guide to tourniquet application, review this article on **Using Tourniquets to Stop Bleeding**. To view a guide with pictures, consult **How to Use a Tourniquet Around an Injury**.

HANDLING BEE STINGS

1. If the student is allergic to bees, call 911 and employ use of an EpiPen or other device immediately.
2. Remove the stinger as soon as possible. Avoid using tweezers because they will irritate the skin and make the removal more difficult.
3. Wash the affected area with soap and warm water.
4. Apply a cold pack or ice pack to reduce swelling of the affected area. If you notice swelling in other areas (not the area of the sting), seek medical attention immediately. Difficulty breathing, hives, nausea, and dizziness are also signs of an allergic reaction.

For more information on bee stings, please view the **American Academy of Dermatology recommendations**.

HANDLING ANIMAL BITES

1. Wash the wound with soap and warm water.
2. Notify parents of the bite.
3. Regardless of the size of the bite, consult a doctor. A professional will be able to screen for any diseases transmitted by the animal and to treat them accordingly.

HANDLING CHOKING

When food obstructs pathways of air to the lungs, one may choke. A universal indicator that someone is choking is that they are unable to speak, breathe, or cough. They may also be clutching their neck or chest.

1. Dislodge the blockage. This can be done by firmly hitting the victim's back in the area between the shoulder blades. If this does not work, deploy the Heimlich maneuver.

2. Call 911 if airways remain blocked.

THE HEIMLICH MANEUVER

The Heimlich maneuver utilizes abdominal thrusts to dislodge the material blocking one's airways.

1. Stand behind the choking victim.
2. From behind, wrap your hands around their stomach and form a fist.
3. Pull your fist inwards and upwards in sharp motions.
4. Repeat the process up to five times.

For more information on the Heimlich maneuver or to watch an example of the practice, please visit the British Red Cross [First Aid Page for Choking](#).

HANDLING AN ALLERGIC REACTION

Common allergic triggers include stings, bites, pollen, latex, and specific food items.

Symptoms of allergic reactions may range from mild to severe and potentially life-threatening. In severe cases, contact with known allergic triggers can lead to swelling, difficulty breathing, and anaphylactic shock. If severe allergies are known, doctors may provide an auto-injector, such as an EpiPen, to be used in case of emergency.

1. Remain calm.
2. Call 911.
3. If applicable, find and use the student's auto-injector. The directions for use should be on the injector itself.
4. Keep the victim calm and comfortable as you wait for help to arrive.
5. Upon arrival of medical professionals, tell them that an auto-injector has been used (if applicable).

For more information on response to allergic reactions, please visit the British Red Cross's [page on Severe Allergic Reactions](#).

HANDLING SUNBURN

1. Apply aloe vera or moisturizing lotion to the affected area.
2. Wrap an ice pack in a towel or cloth and apply to affected area.
3. If blisters form, this indicates a second-degree sunburn. Encourage students not to pop blisters, but to leave them alone.
4. Do not voluntarily peel skin that is already peeling.
5. If necessary, medication can be taken to dull pain associated with the burn.

HANDLING DEHYDRATION

Dehydration is easily avoidable, but may also occur after long periods in the sun without an adequate water intake.

To check if someone is dehydrated, pinch the skin on the back of their hand. If the skin bounces back quickly, then they are hydrated. If the skin is slow to return, then dehydration may occur.

According to the Cleveland Clinic, other signs of dehydration may include:

- Fatigue
- Loss of Appetite
- Flushed Skin
- Heat Intolerance
- Light-Headedness
- Dark-Colored Urine
- Dry Cough

If students exhibit strange behaviors or any of the symptoms above, seek medical attention immediately.

View the rest of the Cleveland Clinic article on **Dehydration Avoidance** [here](#).

HANDLING HEAT-RELATED ILLNESSES

Heat-related illnesses include heat exhaustion, heat stroke, heat cramps, and heat rash.

Heat stroke is a medical emergency. Call 911 right away.

Other heat-related illnesses can be treated on-scene, but seek medical attention if symptoms persist.

Refer to the Centers for Disease Control and Prevention guide to Heat-Related Illness on page 45 for more information.

HEAT-RELATED ILLNESSES

WHAT TO LOOK FOR

WHAT TO DO

HEAT STROKE

- High body temperature (103°F or higher)
 - Hot, red, dry, or damp skin
 - Fast, strong pulse
 - Headache
 - Dizziness
 - Nausea
 - Confusion
 - Losing consciousness (passing out)
- Call 911 right away-heat stroke is a medical emergency
 - Move the person to a cooler place
 - Help lower the person's temperature with cool cloths or a cool bath
 - Do not give the person anything to drink

HEAT EXHAUSTION

- Heavy sweating
 - Cold, pale, and clammy skin
 - Fast, weak pulse
 - Nausea or vomiting
 - Muscle cramps
 - Tiredness or weakness
 - Dizziness
 - Headache
 - Fainting (passing out)
- Move to a cool place
 - Loosen your clothes
 - Put cool, wet cloths on your body or take a cool bath
 - Sip water
- Get medical help right away if:**
- You are throwing up
 - Your symptoms get worse
 - Your symptoms last longer than 1 hour

HEAT CRAMPS

- Heavy sweating during intense exercise
 - Muscle pain or spasms
- Stop physical activity and move to a cool place
 - Drink water or a sports drink
 - Wait for cramps to go away before you do any more physical activity
- Get medical help right away if:**
- Cramps last longer than 1 hour
 - You're on a low-sodium diet
 - You have heart problems

SUNBURN

- Painful, red, and warm skin
 - Blisters on the skin
- Stay out of the sun until your sunburn heals
 - Put cool cloths on sunburned areas or take a cool bath
 - Put moisturizing lotion on sunburned areas
 - Do not break blisters

HEAT RASH

- Red clusters of small blisters that look like pimples on the skin (usually on the neck, chest, groin, or in elbow creases)
- Stay in a cool, dry place
 - Keep the rash dry
 - Use powder (like baby powder) to soothe the rash





**Gardening
in the
Classroom**

Part 3: Gardening in the Classroom

Gardening and Education

In order for the community garden to hold a permanent and important role in a student’s life, it is important that students interact with the garden on a regular basis. While garden club meetings may not be held daily, students should still be encouraged to implement the garden into their daily routine. By incorporating the garden itself and garden-related activities into the daily curriculum, students will be more comfortable and familiar with the garden and will also be more willing to include it in their lives outside of school.

With a bit of creativity and innovation, the Walls Community Garden can be incorporated into the curriculum of any number of core classes. The following pages suggest opportunities in which to introduce gardening to daily curriculum. They are intended to spark further thought into this topic.

INCLUSION OF ALL
<i>Information adapted from Growing Gardens Lesson Plan Manual, p. 14-15.</i>
<p>Garden club activities are easily adapted to target students in K-2nd grade, as well as those in grades 3 to 5. Lessons should also engage English Language Learners or students with physical or developmental disabilities.</p>
<p>English Language Learners (ELLs) should feel welcome and comfortable in a school and club environment. Target this population using pictures in addition to text and oral explanations. Encourage involvement through the telling of stories and through music or song. Hands-on activities will encourage involvement and build trust between students and teachers or students and their peers.</p>
<p>Students with physical or developmental disabilities should be encouraged to participate in all activities. Ask students what they are comfortable with. Do not assume that their disability hinders their ability to participate. Make necessary accommodations as needed to ensure that they feel welcome in the club, too.</p>

Subject-Specific Recommendations

1: Gardening and Art

Every garden is full of a variety of colors and shapes. Use the Walls Community Garden to inspire an assignment or art project.

- Take at least one class period to get out into the garden, and to draw or paint.
- Use observed plants or animals as a muse, and have the students recreate them in their artwork.
- Ask students to create a piece that utilizes the colors that they observe.
- Press leaves or flowers.
- Create “rubblings” using tree bark, leaves, or other plants.
- Cover leaves in paint and use them as stamps.
- Use the plants or animals in the garden as reference for drawing flowers, leaves, trees, dirt, clouds, and other artwork.

2: Gardening and English, Reading, or Language Arts

The names of garden plants and animals are rooted (no pun intended) in multiple languages. Study the history of scientific plant names and use them to your advantage in the classroom.

- Teach syllables using plant names.
 - One-Syllable Word Examples
 - Fig
 - Root
 - Leaf
 - Dig
 - Sun
 - Stem
 - Two-Syllable Word Examples
 - Carrot
 - Garden
 - Shovel
 - Three-Syllable Word Examples
 - Hibiscus
 - Sunflower
 - Gardening
 - Evergreen

■ Potato

- Have students label plants in the garden.
- Have students list words associated with the garden.
- Have students write about what they would plant if they had their own garden.

3: Gardening and Gym

Not all garden-related activities have to address the garden directly. To create a partnership between gardening and P.E. curricula, encourage physical activity in the green space around the garden. The more that students are aware of the garden's presence, the more their curiosity and interest will build.

- Bring students outside and allow them to play around the garden.
- Hold races, tournaments, or friendly competitions around the garden.

4: Gardening and History or Geography

Gardens vary across the globe. Encourage gardening in your curriculum by exploring the global locations in which certain garden plants and flowers may originate. Discuss the history of gardening during major events in the American timeline.

- Teach students where common fruits and vegetables come from. Ask students to label these locations on a world map.
- Relate gardening to major world events.
 - Victory Gardening of World War One and World War Two
 - The Irish Potato Famine
 - Discuss gardening styles during time periods such as the Renaissance.
 - Discuss the importance of gardening to historic populations, such as the early settlers of the 13 colonies.
 - Discuss the effects of hunting and gathering on gardening.

5: Gardening and Math

The mathematics curriculum is extremely flexible, but can easily become complicated for students to understand. Help students visualize mathematical transactions using garden resources as visual examples. Use the garden as a tool to work through math problems.

- Ask students to count plants, tools, seeds, and other materials and to record their observations.
 - Example Questions

- How many plots are located in the garden?
 - How many tomato plants are there in the garden?
- Ask students to measure the length of garden materials.
 - Example Questions
 - How long is the wall of the garden?
 - How long is this garden plot?
 - What is the perimeter of this garden plot? What is the area?
- Reference the garden in word problems.
 - Example Question
 - Adam wants to grow tomatoes in his garden next season. He plans to collect the seeds from his current tomato plants and use those for the next year. If Adam currently has 3 tomato plants and each tomato plant produces 5 seeds, how many seeds will he collect to use next year?

6: Gardening and Music

Music may increase plant growth. Take time to go into the garden and sing to the plants.

- Sing to garden plants to stimulate growth.
- Sing garden-themed or environment-themed songs in the classroom.

7: Gardening and Science

Scientific methods allow for observation and experimentation. Use the fruits, vegetables, flowers, and herbs of the garden as inspiration for science fair experiments.

- Take measurements in the garden.
- Have students record their observations from the garden. Use this process to teach the scientific method.
- Classify plants by their scientific name.
- Learn about parts of a plant.
- Learn about the water cycle and how it affects plant growth.
- Learn about photosynthesis.
- Differentiate between plant and animal cells.

Lesson Plans

Growing Gardens is a nonprofit organization in Portland, Oregon that specializes in helping others grow their own food. This organization has put together lesson plans for school garden clubs ranging from kindergarten to 5th grade. There are eight lessons put together by this organization, summarized in the table below.

GROWING GARDENS LESSON PLAN SUMMARY	
<i>To view the lesson plans put together by Growing Gardens, please visit page 120 of this manual. To view Growing Gardens' full Youth Gardening Manual, please click the link.</i>	
Lesson I: Introduction to the Garden	
"Highlights gardening basics, including: planting seeds and plant starts, using tools safely and correctly, and understanding garden rules. Students investigate the garden using a scavenger hunt and plant seeds either indoors or outdoors to watch them grow throughout the term. Students taste a new fruit or vegetable."	
Lesson II: Parts of the Plant	
"Students learn about the six different parts of the plant by acting out plant life cycles and using all of their senses. Students discover which parts of the plant we eat, what plants need to grow, and how the fruits and vegetables we eat relate to the plant life cycle. Students taste all six parts of the plant in one bite, in a 'plant part wrap.'"	
Lesson III: Seeds and Seed Dispersal	
"Students explore what seeds need to sprout, and how seeds move around in the world by wind, water, and animals. Students explore the different types of seeds found in the garden, plant life cycles, why seeds are important for wildlife, and how we can save seeds from fruits and vegetables we eat. Students also learn about how seeds can be used in different foods, and taste seeds."	
Lesson IV: Flowers and Pollinators	
"Students investigate the structure of flowers and discover the importance of flowers and pollination in growing fruits and vegetables. Students discover how bees, butterflies, and other pollinators distribute pollen to other flowers and how flowers attract pollinators. Students also learn about the flowers we use as food and taste edible flowers, such as nasturtiums, broccoli, or cauliflower."	

Lesson V: Bugs and Insects

“Through a garden investigation, an introduction to insect anatomy, and a game highlighting the role of beneficial insects, students learn about the importance of bugs and insects in establishing a healthy food garden, and how garden ‘pests’ can be controlled without using chemicals that could harm the soil and the environment. Students create and eat “edible insects” made from fruit and vegetables.”

Lesson VI: Soil and Compost

“Highlights the composition of soil and the role soil plays in the garden to grow healthy food. Through activities and games, students investigate what soil is made of, learn different methods of composting and the importance of waste reduction, and learn about the microorganisms in the soil that play a valuable role in food production. Students taste a root vegetable, grown directly in the soil.”

Lesson VII: Wondrous Worms

“Students learn and explore worm anatomy and habitat using a worm bin. Students apply their knowledge by investigating outdoor garden spaces for the presence of worms, and learn about the role of decomposition in the web of life through art activities and a tag game. Students taste a fruit or vegetable harvested from the garden.”

Lesson VIII: Celebration

“Review and celebration of what was learned in the eight weeks of Garden Club. The lesson includes “Garden Jeopardy” a fun way to review garden topics, as well as a chance for the class to pick a favorite garden game to play. Students taste a special snack for the last day, possibly a rainbow smoothie or kiwi parfait (recipes included).”

Games

In addition to the lessons above, additional games and activities can be used to supplement garden club lessons and meetings. Construct your own meeting plan using the games, activities, and exercises listed in this manual.

GAME INSTRUCTIONS	
Game	Instructions
<i>Note: Games in italic font are taken from the Walls Wellness program.</i>	
Scavenger Hunt	<p>Construct a list of 10 materials (such as animals, vegetables, bugs, plants, colors, etc.) for students to find in the garden. If the student finds all of the items on the list, then they get a prize.</p> <p>To view a printable scavenger hunt worksheet, please visit page 77.</p>
Garden Bingo To make your own bingo sheet online for free, please visit My Free Bingo Cards .	<p>Put together bingo sheets substituting garden materials for numbers. Ask students to go out into the garden and find the things on their bingo sheet. If they can find all the garden plants, animals, etc. that they need for a bingo, they get a prize.</p> <p>For printable Garden Bingo sheets, please visit page 74..</p>
<i>Gotcha</i>	<p>Students all stand in a circle. Ask them to hold their right hand flat and their left hand with the pointer finger on the right hand of the person to their left. Play music. When the music stops, you are supposed to grab the person's finger with your right hand and at the same time pull your finger off of the person's hand next to you.</p>
<i>Beach Volleyball</i>	<p>Get a beach ball. Break the students into groups and play volleyball with the beach ball.</p>

<p><i>Keep It Up</i></p>	<p>Using a beach ball, have the students try to keep the ball in the air without having it drop to the ground.</p>
<p>The Favorites Game</p>	<p>Ask students to stand in a circle, and allow one student to start with a beach ball. Choose a category. The student with the ball tosses it to another student. When that person catches it, they must name something in the chosen category. The person with the ball then throws it to someone else, and the game continues.</p> <p>Example: The category is fruit. The ball is thrown to a student, who must catch it and name any fruit.</p> <p>Possible Categories:</p> <ol style="list-style-type: none">1. Favorite Food2. Favorite Fruit or Vegetable3. Insects in the Garden4. Animals in the Garden5. Parts of a Plant <p>You could also ask a question and call on a student to answer using the beach ball.</p> <p>Example: "Why are weeds bad?" The ball is thrown to a student, who would answer the question.</p>
<p>Barnyard</p>	<p>Gather students and separate into four teams. Appoint one leader from each team to be the "farmer" for each group; the rest of the students in the group are the "finders."</p> <p>Each group then comes up with their own defining barnyard noise (ex. "Moo," "bark," "neigh," "oink," "hoot," "bawk," etc.). Print and spread out the cutouts on page 69 of this manual. Each team is assigned to one cutout.</p> <p>The goal of each team is to guide their farmer to each cutout using their barnyard noise. "Finders" must scout out the cutouts and alert</p>

	<p>their farmer with their team noise. Finders are not allowed to touch the cutouts! It is the farmer's job to follow the team noises and collect all of the cutouts for their team.</p> <p>The first team to collect all of their cutouts wins.</p>
<i>The Wink Game</i>	<p>Have someone go out of the room. Select one student to be the winker. The winker will wink at students in the room. Once you get winked at, you have to put your head down on your desk (or sit down if you are standing). The student who was sent out of the room while you selected the winker will come back in and try to figure out who is the winker.</p>
Four Corners	<p>This game must be played indoors in a classroom. Label each corner of the room with a number: 1, 2, 3 or 4. Assign one student to be "it." The student who is "it" will sit blindfolded in the middle the of the room while the other students pick a corner to stand in. The person that is "it" says a number, and the people in that corner are out. At this point, students can choose to stay in their chosen corner or to move to a new corner. The student who is "it" will keep saying numbers until there is just 1 person left.</p> <p>To make this game more garden-related, mark corners with vegetables, fruits, or other garden plants and ask students to move based on their favorite vegetable.</p>
Would You Rather?	<p>Offer students a choice of two fruits, vegetables, or flowers and ask them which one they like better. To get students more active, have them move to one side of the room or the other depending on their pick.</p> <p>Example Questions:</p> <ol style="list-style-type: none">1. Would you rather eat a fruit or a vegetable?2. Would you rather go running or go

	<p>hopping?</p> <p>3. Would you rather have a pet butterfly or a pet bird?</p> <p>You can also use this method to determine which game or activity the students would like to do for the day.</p>
The Game of Hot and Cold	<p>Students partner up and go into the garden. One person of each pair is "it." The person who is "it" thinks of a plant or other item that they see in the garden. The other student must try to locate this item while whoever is "it" tells them if they are getting close (hot) or going in the wrong direction (cold). After the student guesses, they take a turn being "it."</p>
<p>GoNoodle</p> <p>To explore GoNoodle, please visit https://www.gonoodle.com/.</p>	<p>GoNoodle is an online program full of educational videos that both teach students helpful life skills and encourage them to move. It is somewhat geared toward younger students, but can be applied in garden club activities as well as a physical activity component.</p>
<p>Summer Hand Games and Songs</p> <p>Browse through a list of circle games and hand songs at Let's Play Kids.</p>	<p>Encourage speech development, motor skills, and imagination with garden-theme hand songs or circle games.</p>
The Matching Game	<p>Print flash cards with fruits, vegetables, flowers, and garden tools. Place cards facedown on a flat surface. Students must pick a card and create a matching pair.</p>
Freeze Dance	<p>Play a song, pausing at certain intervals. Students should be encouraged to dance, run, and move with the music. When the music stops, students should freeze in place. Repeat until the song is over.</p>
Buzz (Counting Game)	<p>Students count items in the garden. Every fourth item is replaced by the word "buzz."</p> <p>Example: How many seeds are in this package?</p> <p>1, 2, 3, buzz, 5, 6, 7, buzz, nine, ten...</p>

	<p>This activity can be played by substituting “buzz” for any interval of numbers.</p>
<p>Pictionary or Blind Artist or the Guessing Game</p>	<p>Students choose a garden-related word from a hat. This is what they must draw. Students go up to the board and begin their drawing. The first person to guess what they are drawing gets to choose from the hat and draw next. The game continues.</p> <p>Play the game with partners or small groups to encourage communication and trust-building among the students.</p>
<p>Guess Who</p>	<p>Obtain a “Guess Who” game from a garage sale or thrift store. Replace the characters with garden-related items and play the game as normal.</p>
<p>Thumbs Up</p>	<p>Students sit in a circle. Ask them a yes-or-no question concerning the garden. If students answer yes, then they give a thumbs-up. If they answer no, they give a thumbs-down.</p> <p>This can be used as a game or as a voting system.</p> <p>Example Questions:</p> <ol style="list-style-type: none">1. Do you like cauliflower?2. Is a worm a helpful garden creature?3. Do you like this game?

Exercises

A final way to encourage movement and physical activity in the garden is to exercise. Exercises can be simple or complex, and can cover a range of disciplines including yoga, cardio, and stretching (among others). The list below suggests easy, kid-friendly exercises to try both in the classroom and outside in the garden.

EXERCISES
<i>Information in italics is adapted from the Walls Wellness Program. Click the link to learn more.</i>
Jumping Jacks Start upright with feet together and hands at your sides. Jump out, spread feet, and lift arms above the head. Feet should be shoulder width apart. Jump again, returning to starting position. Repeat.
Sit-Ups Lie on back with knees bent and feet on the ground. Cross arms over chest. Without lifting feet off of the ground, use stomach muscles to curl upper body toward the knees. Return to starting position and repeat.
Push-Ups Lie facedown on the floor. Position palms underneath body, aligned with shoulders. Feet should be together and should touch the ground. Use arm strength to push the body up, keeping the body in straight alignment. Return to starting position and repeat.
Races (Running) Relay races and other friendly competitions allow students to be physically active while also having fun.
Dance Play a song and allow students to release energy through dance.
Hopscotch Use chalk to draw a line boxes on the pavement to prepare for this game. Alternate single boxes and pairs of boxes. Students take turns jumping through the line of boxes until they reach the end.
Jump Rope This exercise can be completed in groups of three or individually. Students jump over a swinging rope. Add a second rope for a harder challenge (double dutch).
Tug of War Divide students into teams of two or four. Teams must work together to pull a rope to their side. To encourage further involvement with this exercise, hold a competition.

Lunges


Start in an upright position with feet comfortably hip-width apart. Take a large step back, bending both the left and right knee. This brings you into a sort of kneeling position. Step forward again to return to starting position. Repeat.

Wall Sits

Students lean against the wall for as long as they can. This exercise should be done in a squatting position.

Core Matrix

Students sit with their legs bent underneath them and they lean backwards. They should feel the stress in the core of their body when doing this stretch.

A pair of hands is shown from the bottom, cupping a small, young tree sapling with a clump of dark soil. The sapling has several green leaves and a thin, brown stem. The background is a soft-focus, dark green, suggesting an outdoor setting. The overall mood is one of nurturing and environmental care.

Appendix of Resources and Citations

Appendix A: References

An Overview of the Walls Community Garden

- Centers for Disease Control and Prevention. The association between school based physical activity, including physical education, and academic performance. Atlanta, GA: U.S. Department of Health and Human Services; 2010.
- Dietary recommendations for healthy children. (2018, April 16). Retrieved February 8, 2019, from The American Heart Association website:
<https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics/dietary-recommendations-for-healthy-children>
- Global recommendations on physical activity for health*. (2011). Retrieved February 9, 2019, from World Health Organization website:
<https://www.who.int/dietphysicalactivity/publications/physical-activity-recommendations-5-17years.pdf>
- Michael, S. L., Merlo, C. L., Basch, C. E., Wentzel, K. R., & Wechsler, H. (2015). Critical connections: Health and academics. *Journal of School Health, 85*, 740-758. <https://doi.org/10.1111/josh.12309>
- O'Neill, A., Quirk, S. E., Housden, S., Brennan, S. L., Williams, L. J., Pasco, J. A., . . . Jacka, F. N. (2014). Relationship between diet and mental health in children and adolescents: A systematic review. *American Journal of Public Health, 104*(10), 31-42. <https://doi.org/10.2105/AJPH.2014.302110>

Funding: Donations

- African Safari Wildlife Park. (2019). Donation requests. Retrieved April 9, 2019, from https://www.africansafariwildlifepark.com/public/donation_requests/
- Culligan Water. (n.d.). Donation requests. Retrieved April 9, 2019, from <https://culliganakroncanton.com/donation-requests>
- Holden Arboretum. (2019). Charitable donation request. Retrieved April 9, 2019, from <https://www.holdenarb.org/about/charitable-donation-request/>
- Insomnia Cookies. (n.d.). Donations. Retrieved April 9, 2019, from <https://insomniacookies.com/donations>
- Off the Wagon Shop. (n.d.). Local donation form request - Kent, Ohio. Retrieved April 9, 2019, from <https://www.offthewagonshop.com/pages/local-donation-form-request-kent-ohio>
- Ohio State Fair. (n.d.). Donation requests. Retrieved April 9, 2019, from <https://ohiostatefair.com/donation-requests/>
- Oriental Trading Company. (2019). Request a donation. Retrieved April 9, 2019, from <https://orientaltrading.requestitem.com/>

Creating a Timeline and Scheduling the First Meeting

- Oregon State University. (2019). Monthly garden calendars. Retrieved April 9, 2019, from <https://extension.oregonstate.edu/gardening/techniques/monthly-garden-calendars>

A Gardening Overview

Smithsonian Gardens. (2014, August 14). *American garden history* [Prezi Presentation]. Retrieved April 2, 2019, from Prezi website: <https://prezi.com/h2wrcynhasgi/american-garden-history/>

Garden Tools

Lowes. (2019). Garden tools buying guide. Retrieved April 2, 2019, from <https://www.lowes.com/projects/gardening-and-outdoor/garden-tools-buying-guide/project>

Common Garden Plants and Care

National Gardening Association. (2019). Plant care guides. Retrieved April 3, 2019, from <https://garden.org/learn/library/plantguide/>

Rhoades, H. (2018, May 10). Tips for growing zucchini. Retrieved April 3, 2019, from Gardening Know How website: <https://www.gardeningknowhow.com/edible/vegetables/zucchini/growing-zucchini.htm>

Handling Weeds in the Garden

HGTV. (2019). How to kill weeds without hurting your garden. Retrieved April 3, 2019, from <https://www.hgtv.com/outdoors/flowers-and-plants/how-to-kill-weeds-without-hurting-your-garden>

Common Garden Encounters

Amateur Entomologists' Society. (2019). Insect groups. Retrieved April 5, 2019, from <https://www.amentsoc.org/insects/fact-files/orders/orthoptera.html>

British Deer Society. (2015). Deer species. Retrieved April 5, 2019, from <https://www.bds.org.uk/index.php/advice-education/species>

Chipmunk and squirrel identification. (n.d.). Retrieved April 5, 2019, from Washington NatureMapping Program website: http://naturemappingfoundation.org/natmap/facts/chipmunk_vs_squirrel.html

Cornell Lab of Ornithology. (2015). All about birds. Retrieved April 5, 2019, from Cornell University website: <https://www.allaboutbirds.org/>

Martens Forney, J. (2019). 16 common garden pests. Retrieved April 5, 2019, from HGTV website: <https://www.hgtv.com/outdoors/gardens/planting-and-maintenance/types-of-garden-pests-pictures>

National Geographic. (2015). Animal pictures and facts. Retrieved April 5, 2019, from <https://www.nationalgeographic.com/animals/facts-pictures/>

Owlcation. (2019, March 22). Caterpillar types and identification guide. Retrieved April 5, 2019, from <https://owlcation.com/stem/caterpillar-identification-2>

The Royal Society for the Protection of Birds. (n.d.). Wildlife guides. Retrieved April 5, 2019, from <https://www.rspb.org.uk/>

U.S. Department of Agriculture. (n.d.). Brown marmorated stink bug. Retrieved April 5, 2019, from National Invasive Species Information Center website:
<https://www.invasivespeciesinfo.gov/profile/brown-marmorated-stink-bug>

Maintenance of the Garden

Kids Gardening. (2017). Gardening basics. Retrieved April 5, 2019, from
<https://kidsgardening.org/gardening-basics/>

Emergency Preparedness in the Field

American Academy of Dermatology. (n.d.). How to treat a bee sting. Retrieved April 5, 2019, from
<https://www.aad.org/public/skin-hair-nails/injured-skin/bug-bites-and-stings/how-to-treat-a-bee-sting>

American Red Cross. (2019). Make a first aid kit. Retrieved April 5, 2019, from
<https://www.redcross.org/get-help/how-to-prepare-for-emergencies/anatomy-of-a-first-aid-kit.html>

British Red Cross. (n.d.). First aid for someone having a severe allergic reaction (anaphylaxis). Retrieved April 7, 2019, from <https://www.redcross.org.uk/first-aid/learn-first-aid/allergic-reaction>

British Red Cross. (n.d.). First aid for someone who is choking. Retrieved April 7, 2019, from
<https://www.redcross.org.uk/first-aid/learn-first-aid/choking##>

Brouhard, R. (2017, May 22). How to use a tourniquet around an injury. Retrieved April 7, 2019, from Verywell Health website:
<https://www.verywellhealth.com/how-to-use-a-tourniquet-1298298#showall>

Cleveland Clinic. (2017, November 24). Dehydration avoidance: Proper hydration. Retrieved April 7, 2019, from
<https://my.clevelandclinic.org/health/treatments/9013-dehydration-avoidance-proper-hydration>

Galante, J. M. (2017). Using tourniquets to stop bleeding. *JAMA*, 317(14).
<https://doi.org/10.1001/jama.2015.8581>

Gardening and Education, Lesson Plans

Growing Gardens. (2016). *Growing gardens youth grow garden lesson manual* [PDF]. Retrieved April 7, 2019, from
<https://www.growing-gardens.org/wp-content/uploads/2013/03/Growing-Gardens-Youth-Grow-Lesson-Plan-Manual-Jan-2016.pdf>

Games

GoNoodle. (n.d.). Home. Retrieved April 9, 2019, from <https://www.gonoodle.com/>

Mullett, S. (2016, June 16). Summer garden songs. Retrieved April 9, 2019, from Let's Play Music website:
<https://www.letsplaykidsmusic.com/summer-songs-in-the-garden/>

My Free Bingo Cards. (n.d.). Free printable bingo card generator. Retrieved April 9, 2019, from
<https://myfreebingocards.com/>

Exercises

Walls Elementary School. (n.d.). Walls wellness program. Retrieved April 8, 2019, from <https://www.kentschools.net/walls/programs/walls-wellness/>

Appendix B: Walls Community Garden Photographs



A bird's eye view of the Walls Community Garden.



Individual plots within the garden fence.



The garden greenhouse. Walls of the greenhouse are made of recycled 2-liter bottles. This is likely where most of the tools will be stored for garden club use.

Left: The greenhouse entrance.
Bottom: A greenhouse wall.





Top Left, Right: The water collection system for the garden.

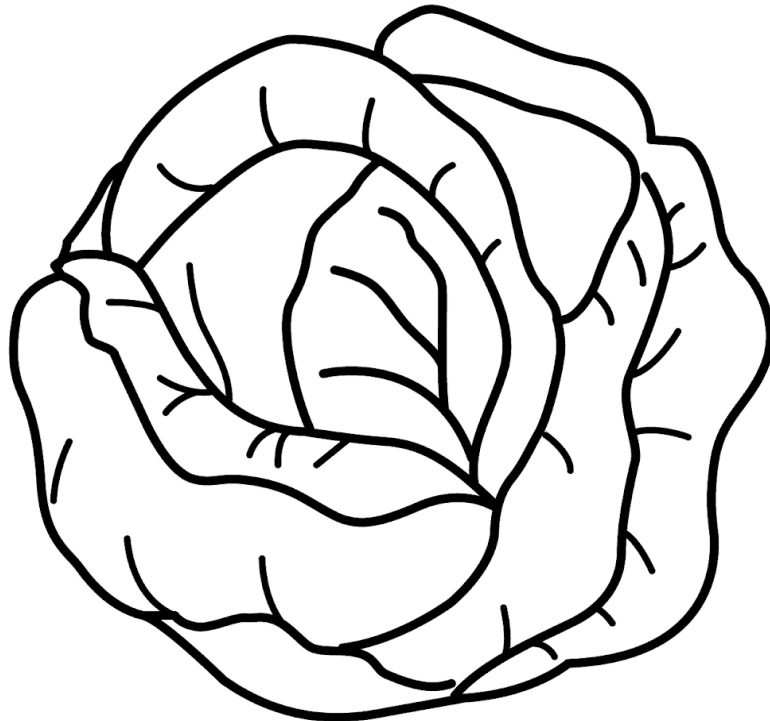
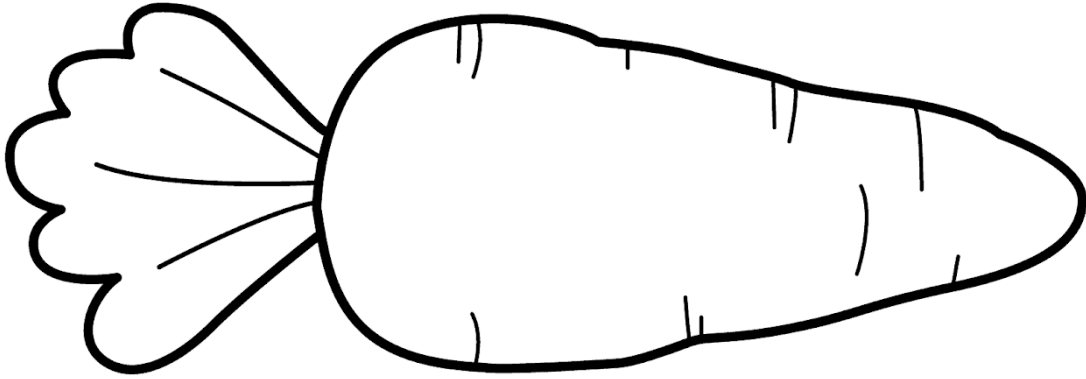
Left: Plots in the garden are numbered for use.

Above: The garden is surrounded by a fence.

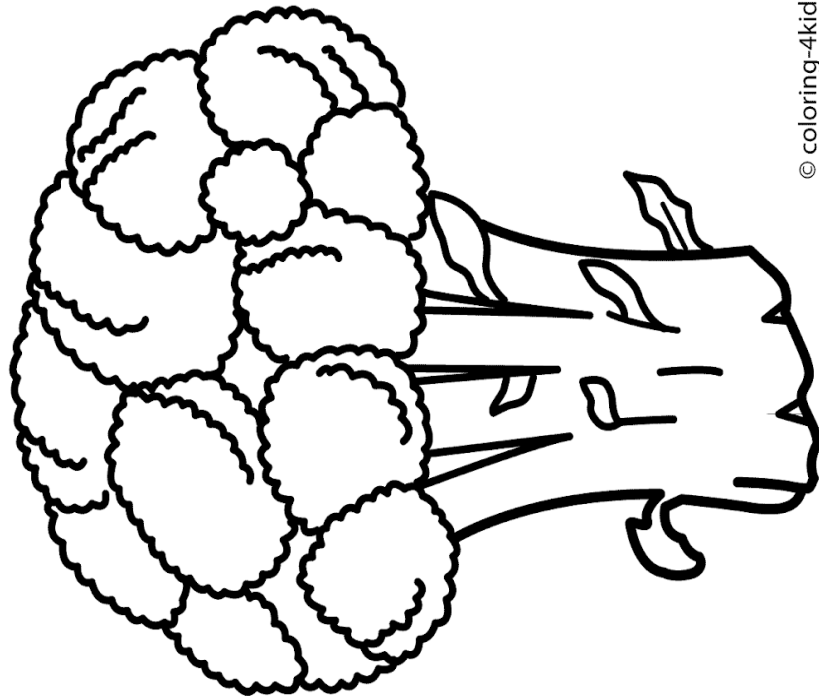
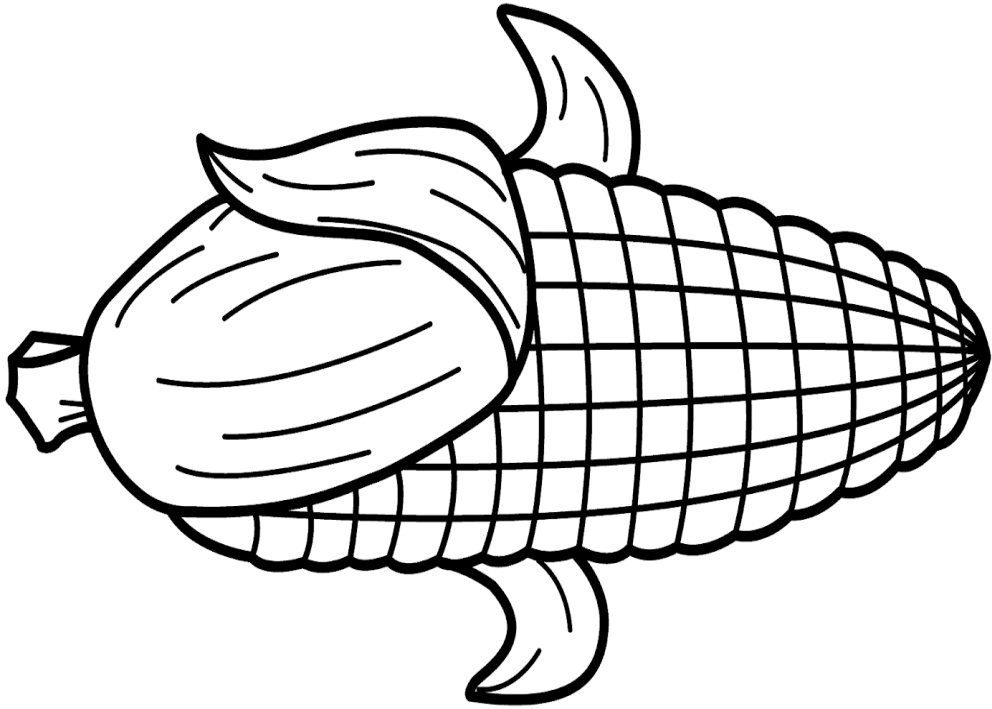
Appendix C: Activity Worksheets

- Barnyard Printables (3 Pages)
 - Print 5 to 6 copies of each fruit or vegetable.
 - Cut out all fruits and vegetables. Laminate if desired.
 - Each team can be assigned to collect one fruit or vegetable. If desired, split into two teams--one team to collect all fruits and one team to collect all vegetables.
- Bingo
 - Choose a pre-made bingo sheet, or use the blank bingo template provided to let students make their own. Students can either write or draw pictures in all of the boxes.
 - Example Bingo Phrases and Pictures:
 - Sun
 - Cloud
 - Leaf
 - Stem
 - Root
 - Dirt
 - Shovel
 - Watering Can
 - Gardener
 - Vegetable
 - Fruit
 - Herb
 - Shed
 - Fence
 - Mulch
 - Hoe
 - Rake
 - Gloves
 - Sprout
 - Flower
- Scavenger Hunt
 - Encourage students to explore the garden and become familiar with its parts.

BARNYARD PRINTABLES

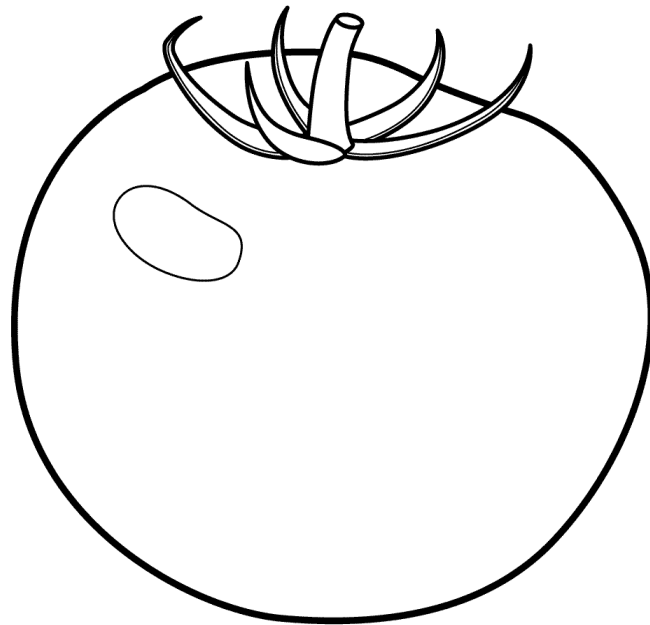
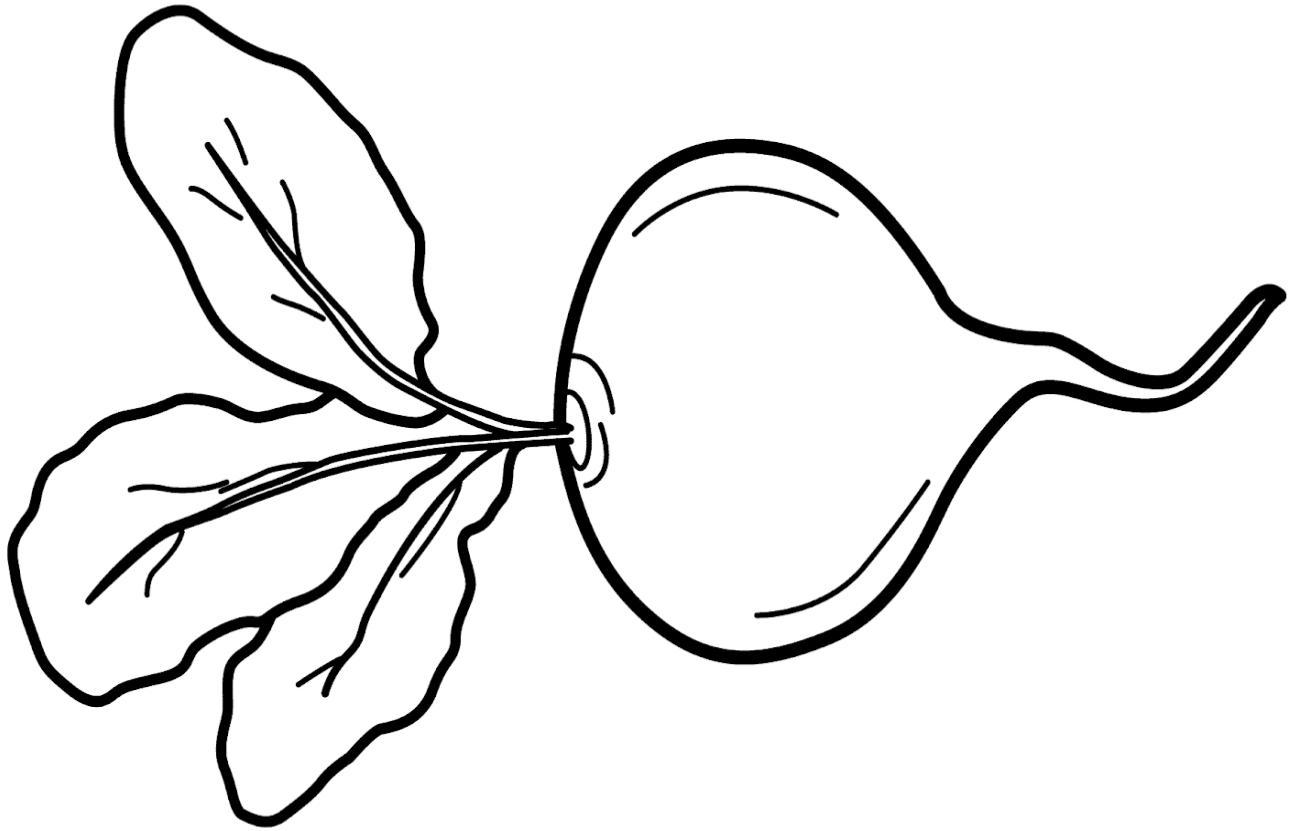


BARNYARD PRINTABLES

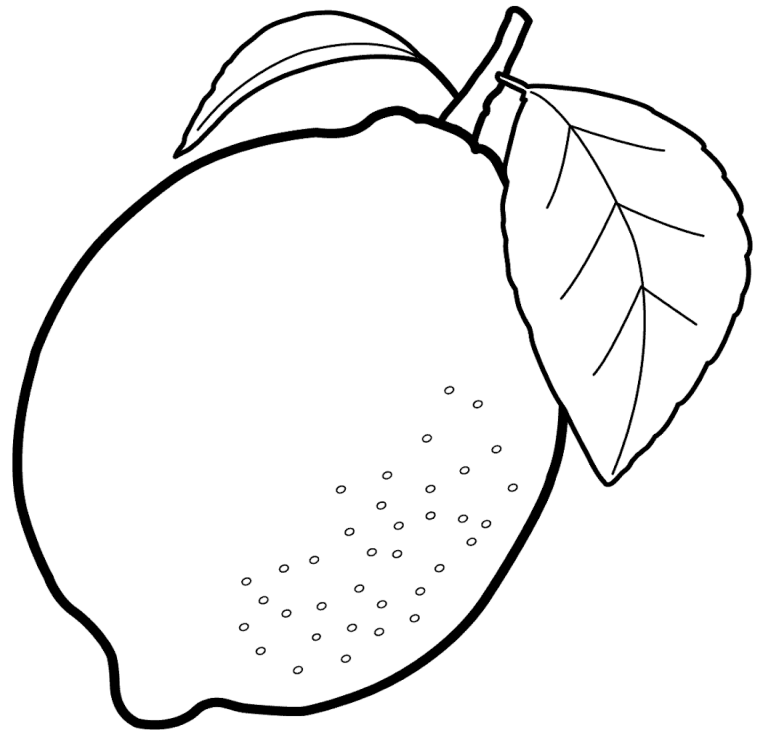
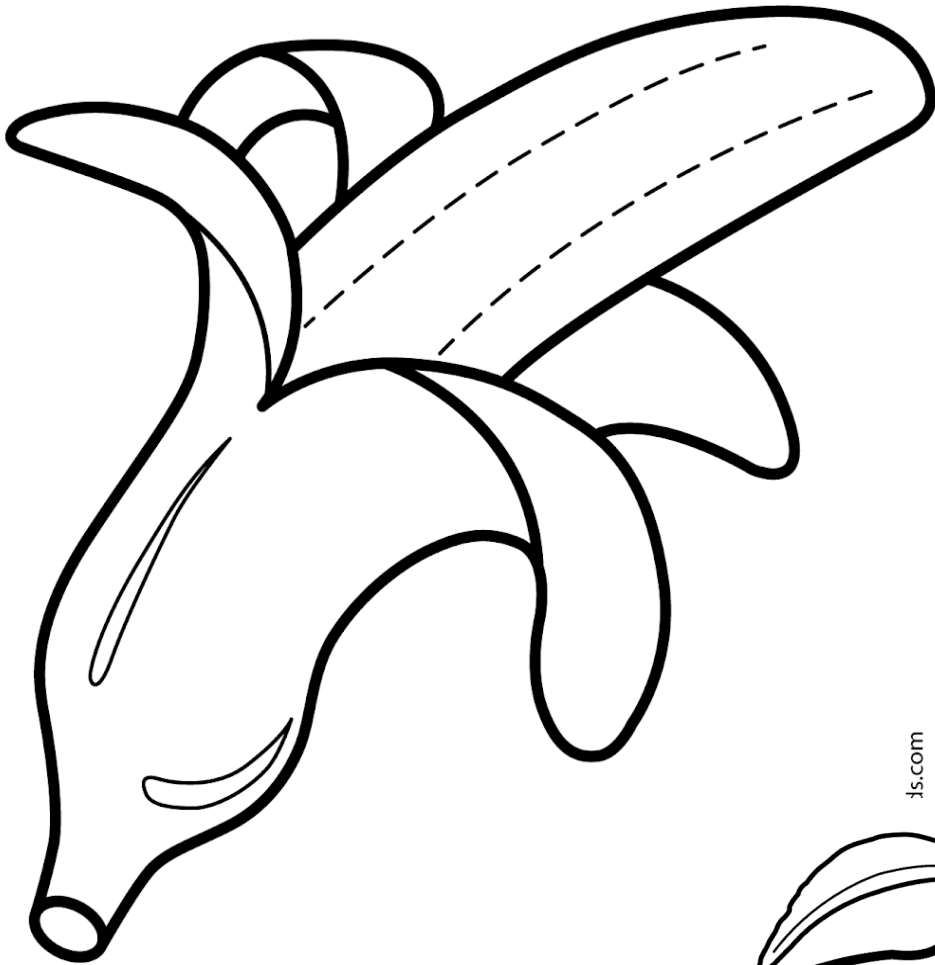


© coloring-4kids

BARNYARD PRINTABLES

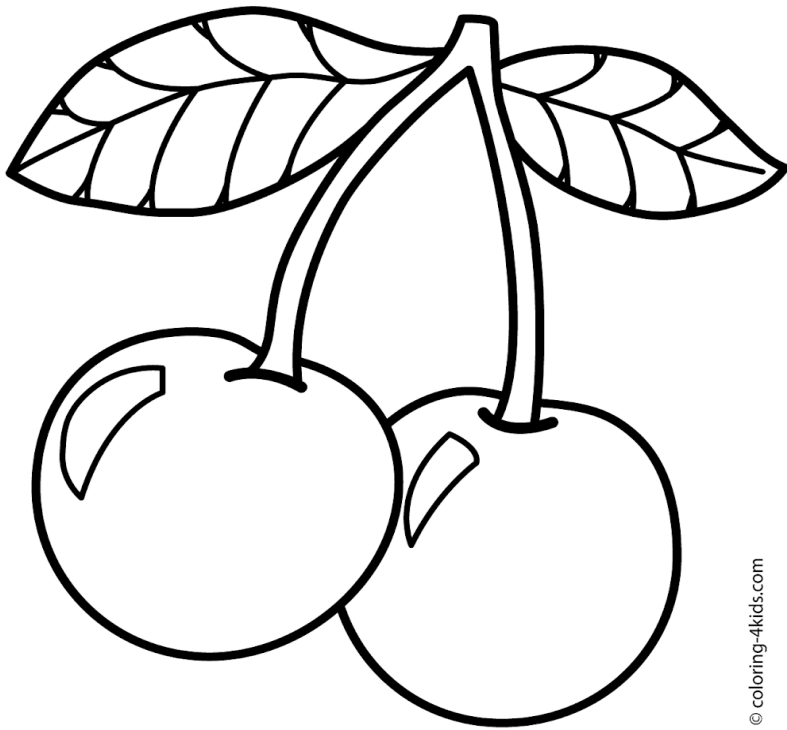


BARNYARD PRINTABLES

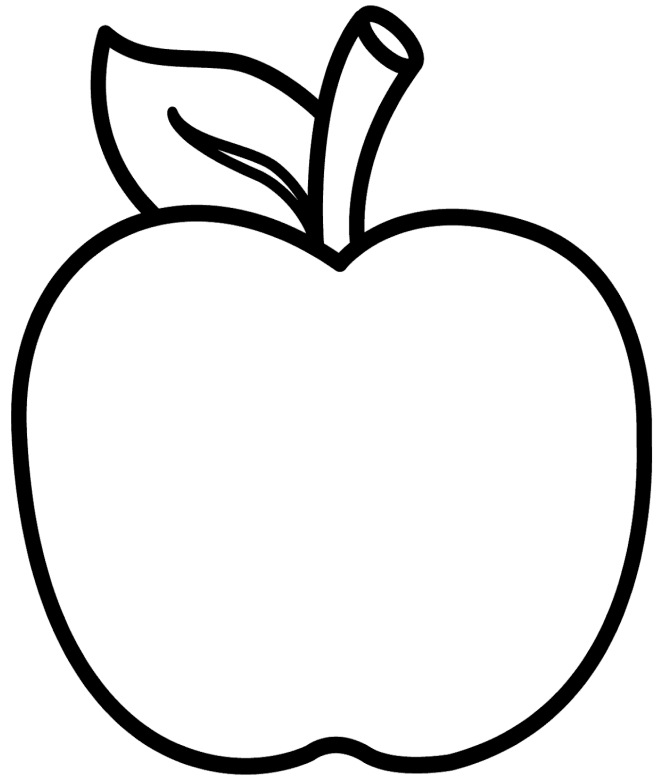


js.com

BARNYARD PRINTABLES



© coloring-4kids.com



Walls Elementary School

GARDEN

BINGO

1

weed

soil

bird

leaf

gardener

insect

vegetable

shovel

watering
can

stem

cloud

flower

gloves

sun

fruit

herb

Walls Elementary School

GARDEN

BINGO

2

gloves

sun

shovel

cloud

fruit

herb

insect

flower

stem

leaf

bird

vegetable

gardener

soil

weed

watering
can

Walls Elementary School

GARDEN

BINGO

3

flower

sun

shovel

weed

bird

herb

watering
can

gloves

vegetable

leaf

fruit

stem

gardener

soil

cloud

insect

Parts of the Garden Scavenger Hunt

Name: _____

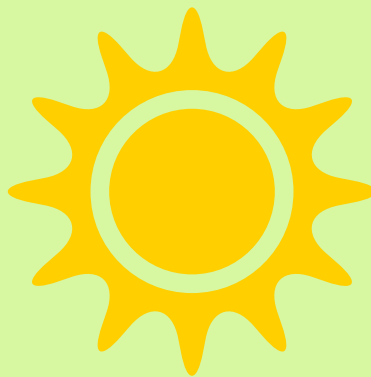
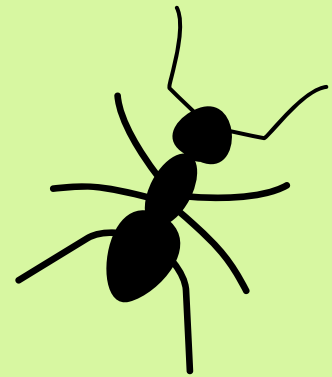


Parts of the Garden Scavenger Hunt

Name: _____



GARDEN SCAVENGER HUNT





plant a tree



garden hose



garden



watering flowers



pot



plant



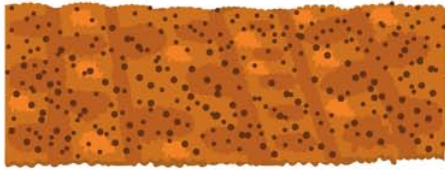
watering can



gloves



boots



soil



gardener



lawn mower



sowing seeds



till the soil



mow the lawn



seeds



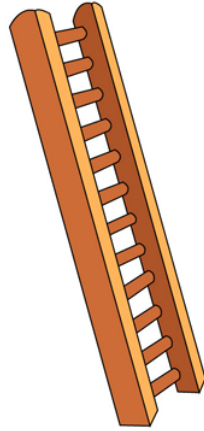
seedling



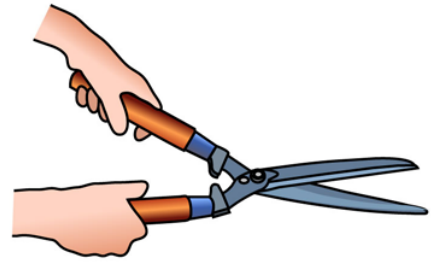
plant sprouting



wheelbarrow



ladder



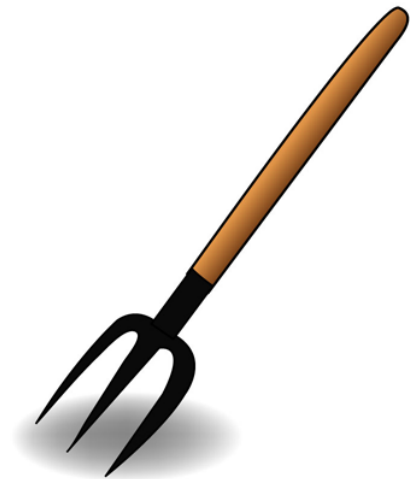
garden shears



shovel



spade



garden fork



rake



rake leaves



digging

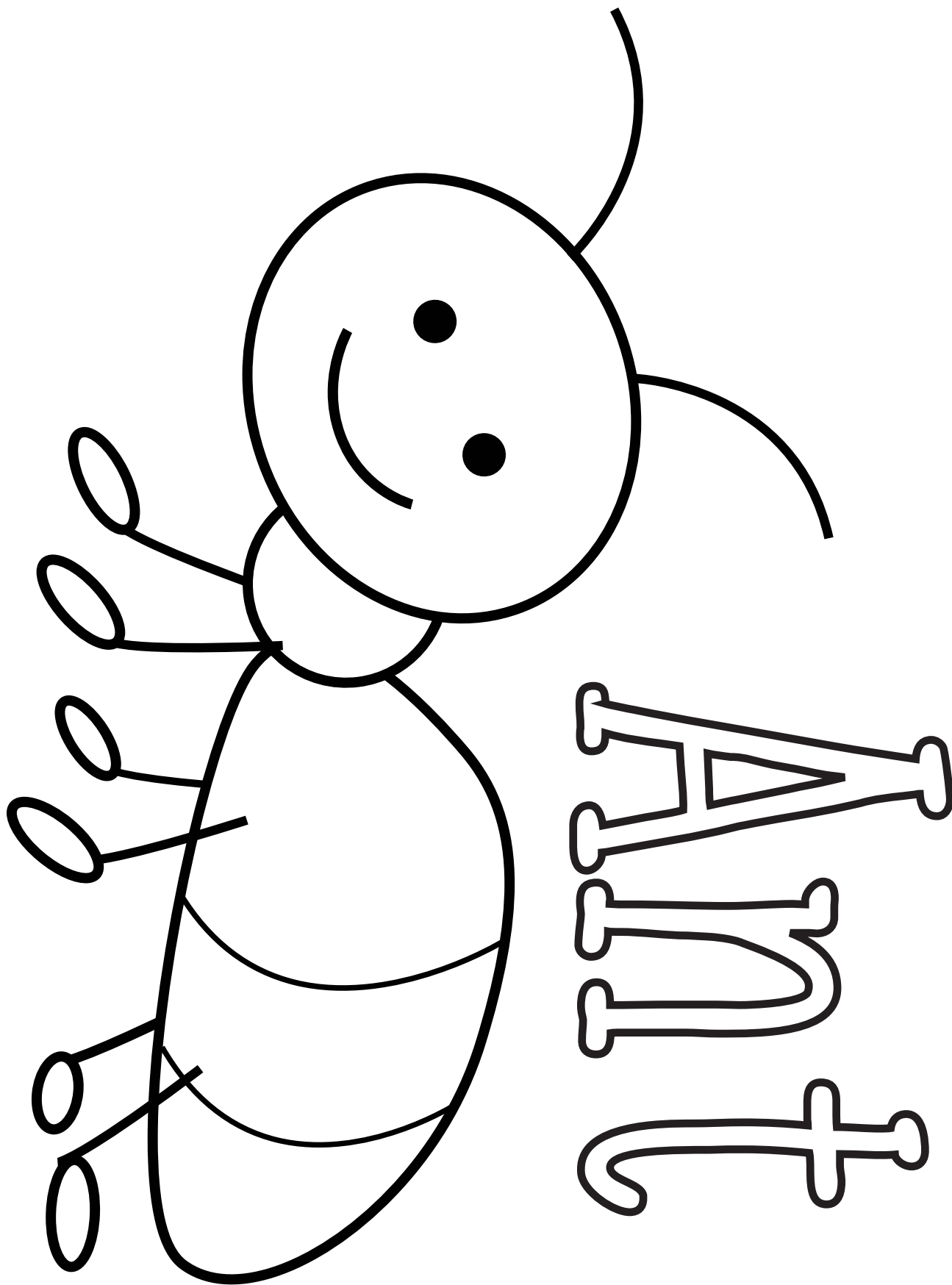
Appendix D: Coloring Pages

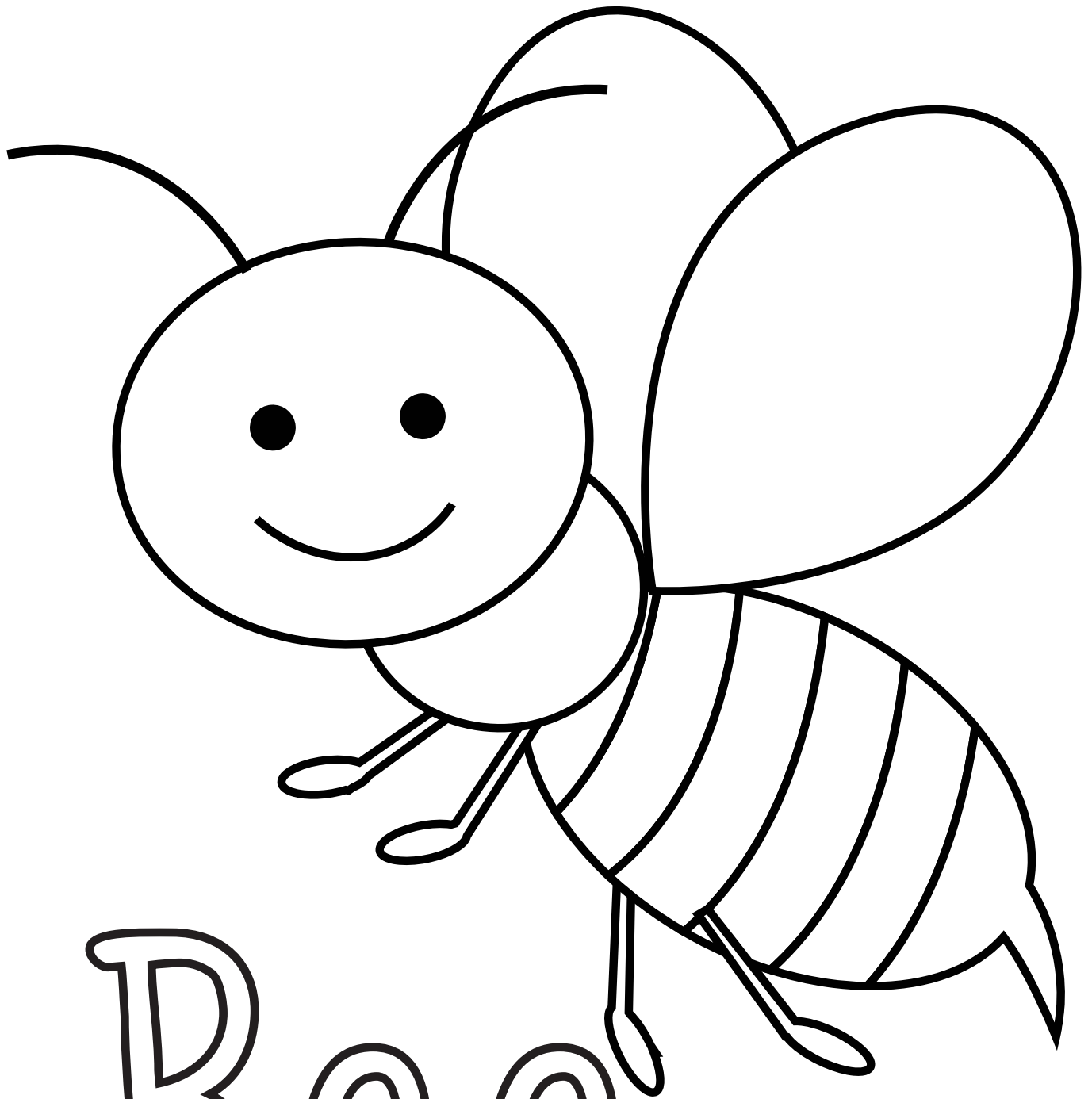
While students are taking part in other club activities or are waiting their turn, use coloring pages as an activity to fill the time. Coloring pages can also be used as an activity on their own.

References

Education. (n.d.). Home. Retrieved April 9, 2019, from <https://www.education.com/>

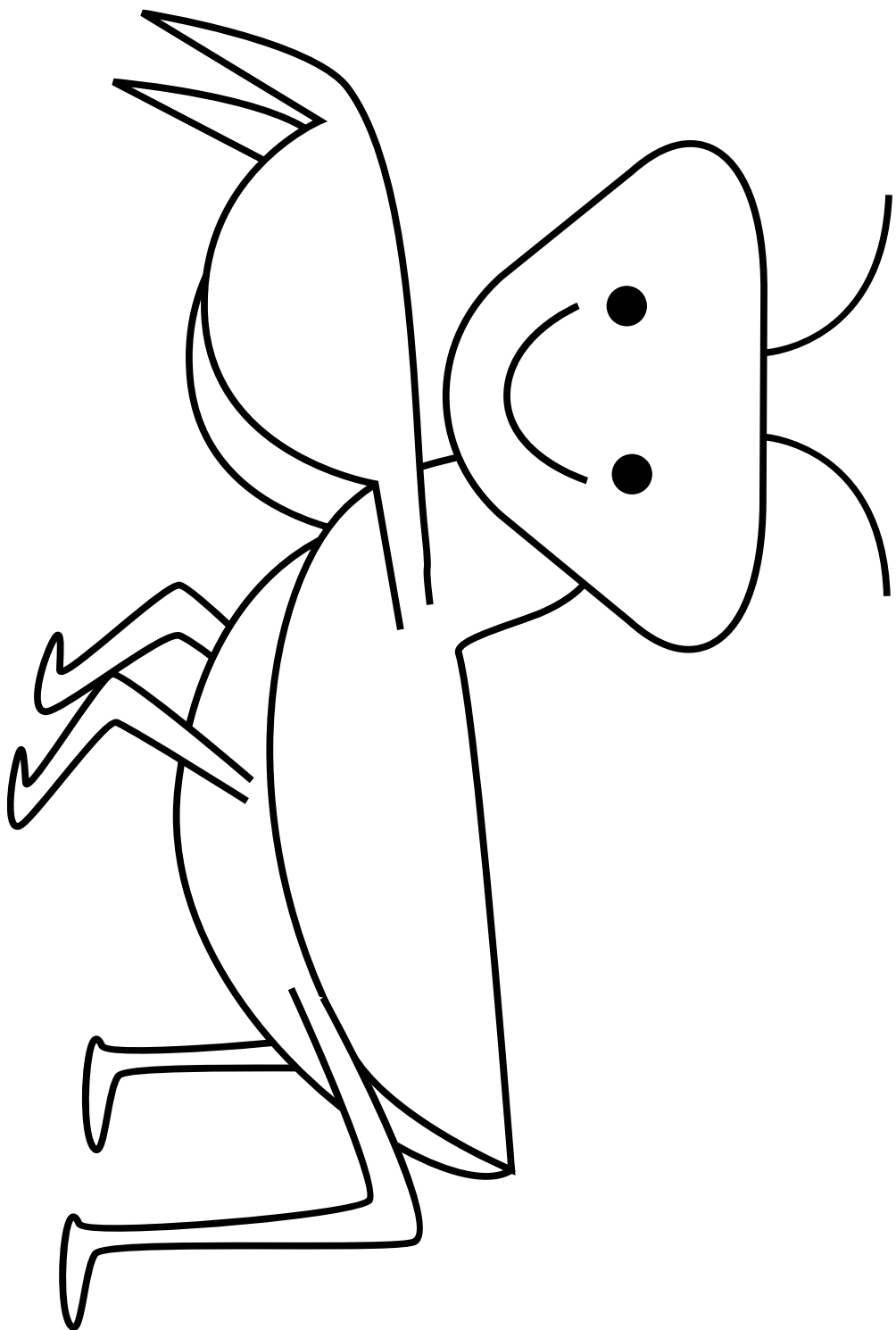
Vucajnk, A. (2019). Crafts for kids, coloring pages, how-to-draw tutorials. Retrieved April 9, 2019, from Easy Peasy and Fun website: <https://www.easypeasyandfun.com/>

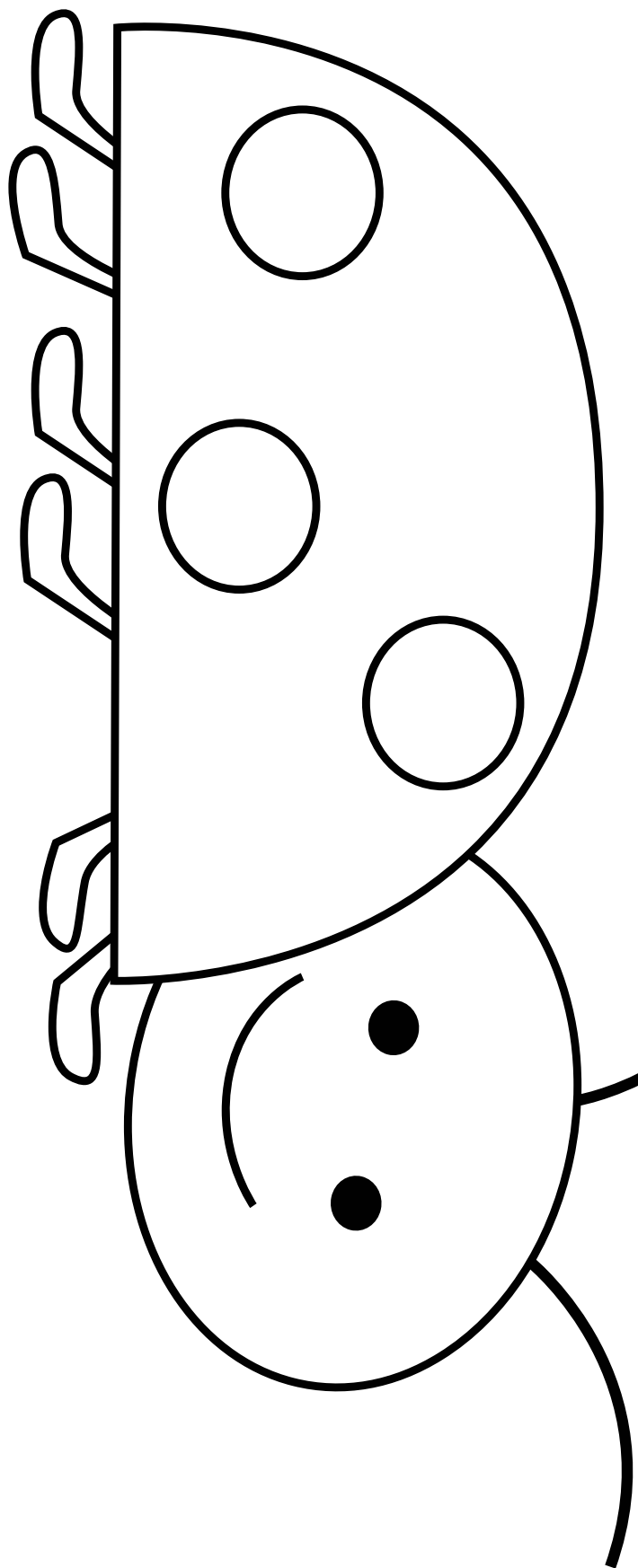




Bee

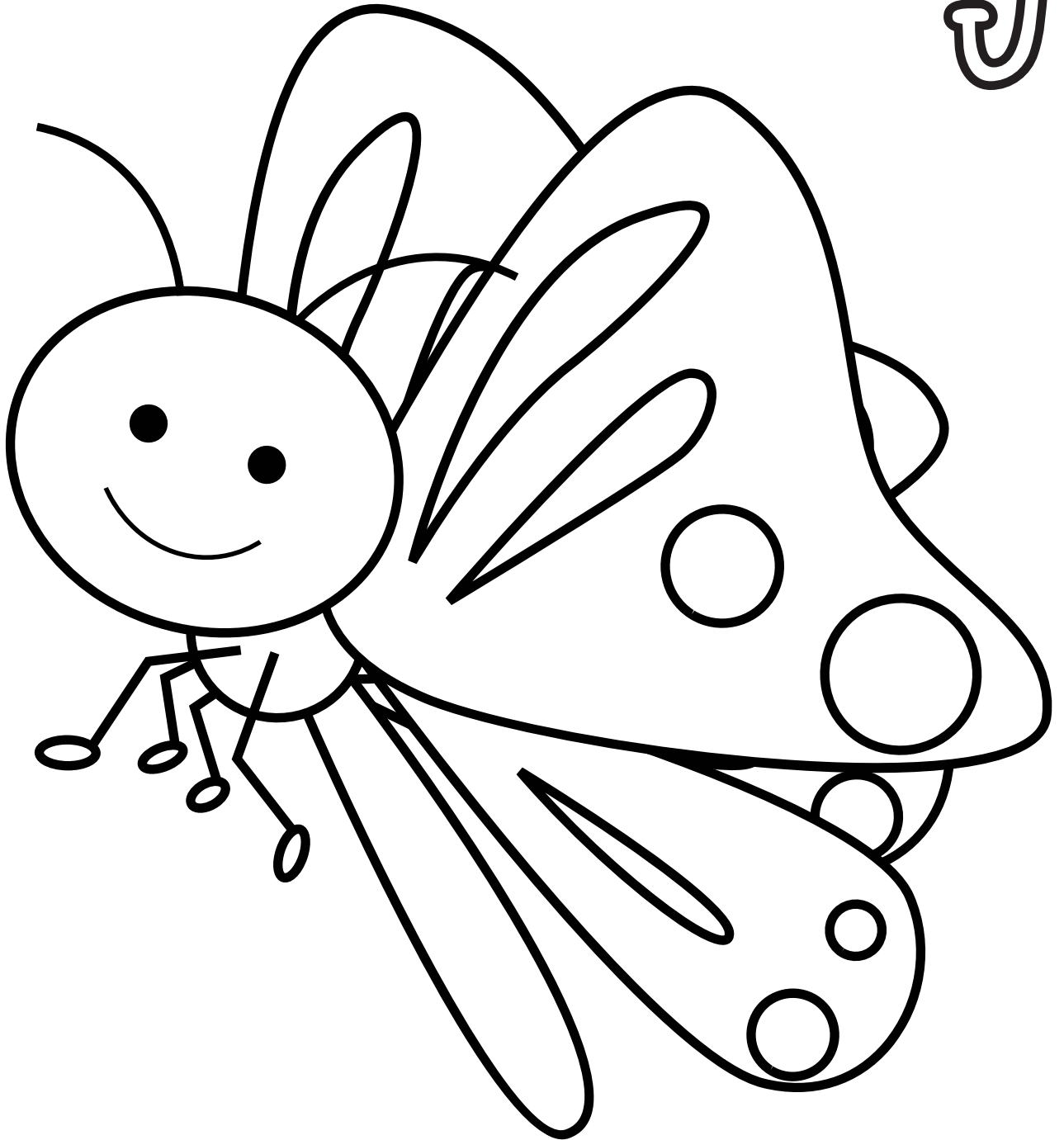
Praying Mantis

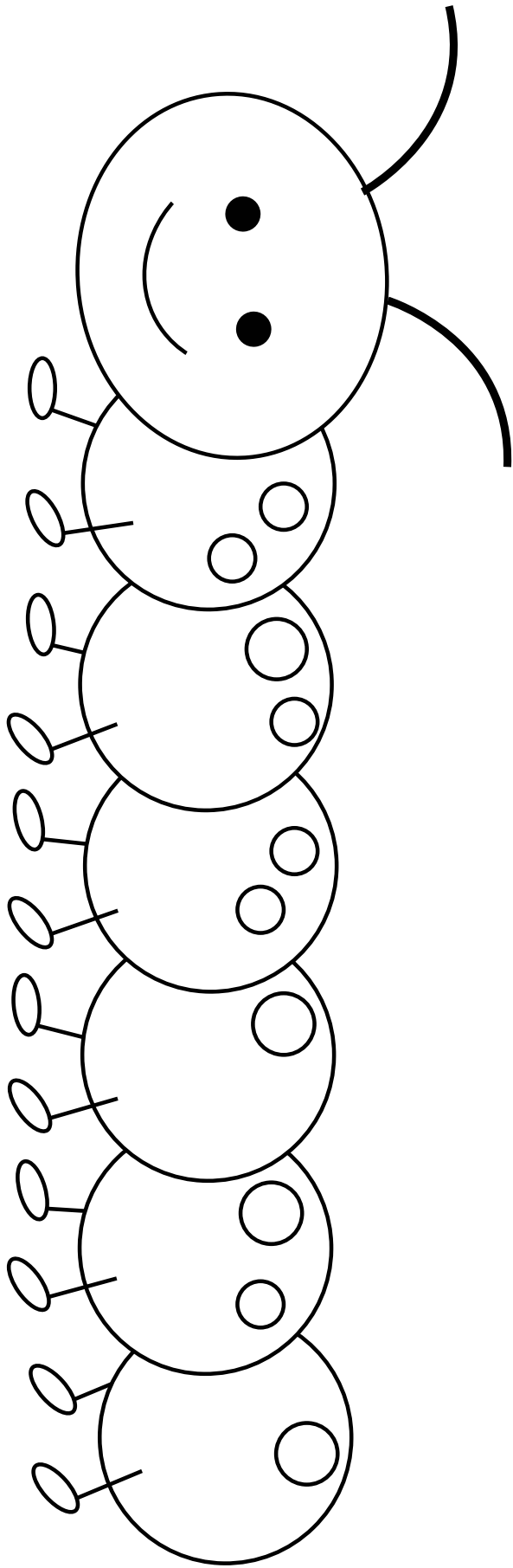




Let's go to the park

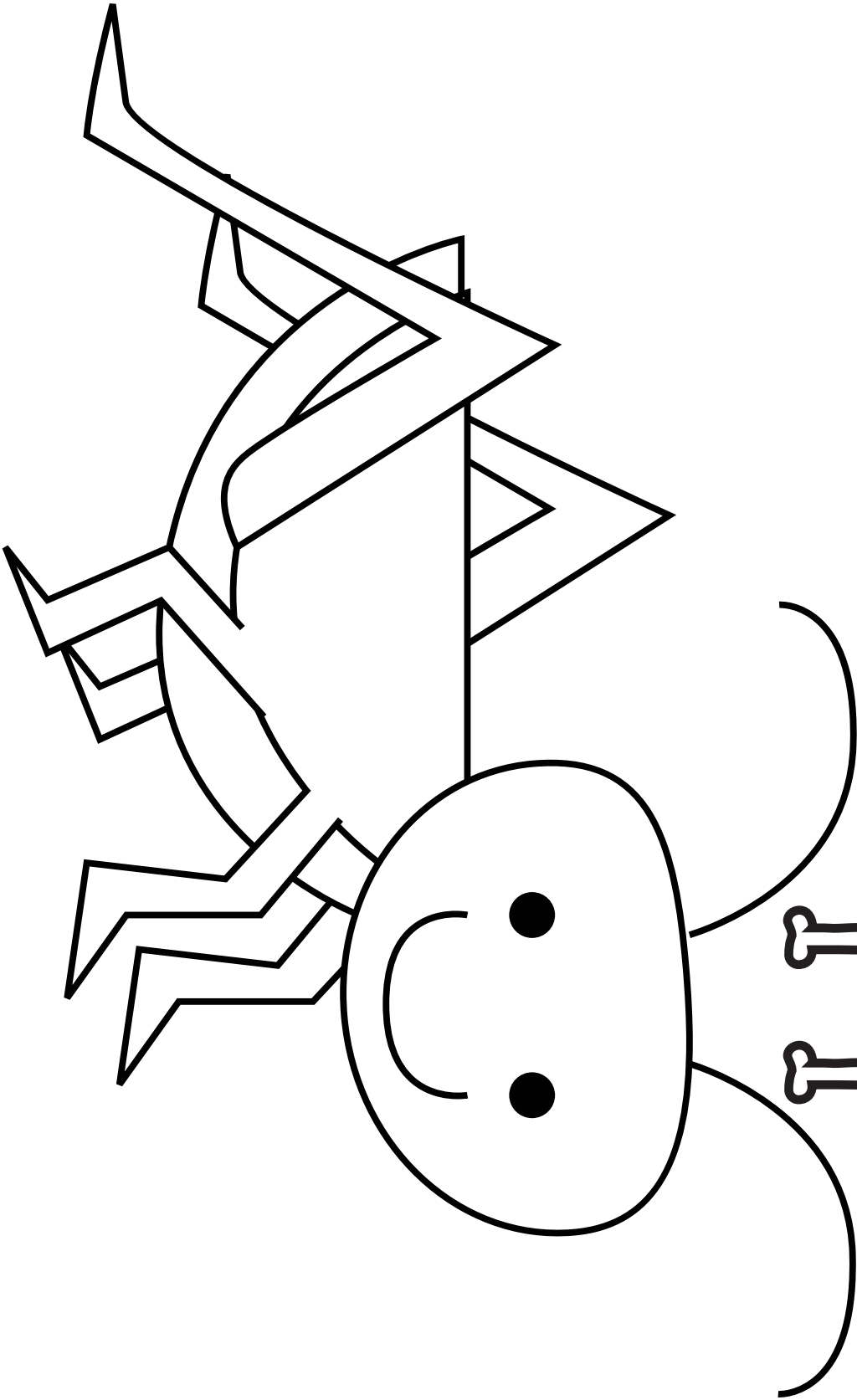
Butterfly



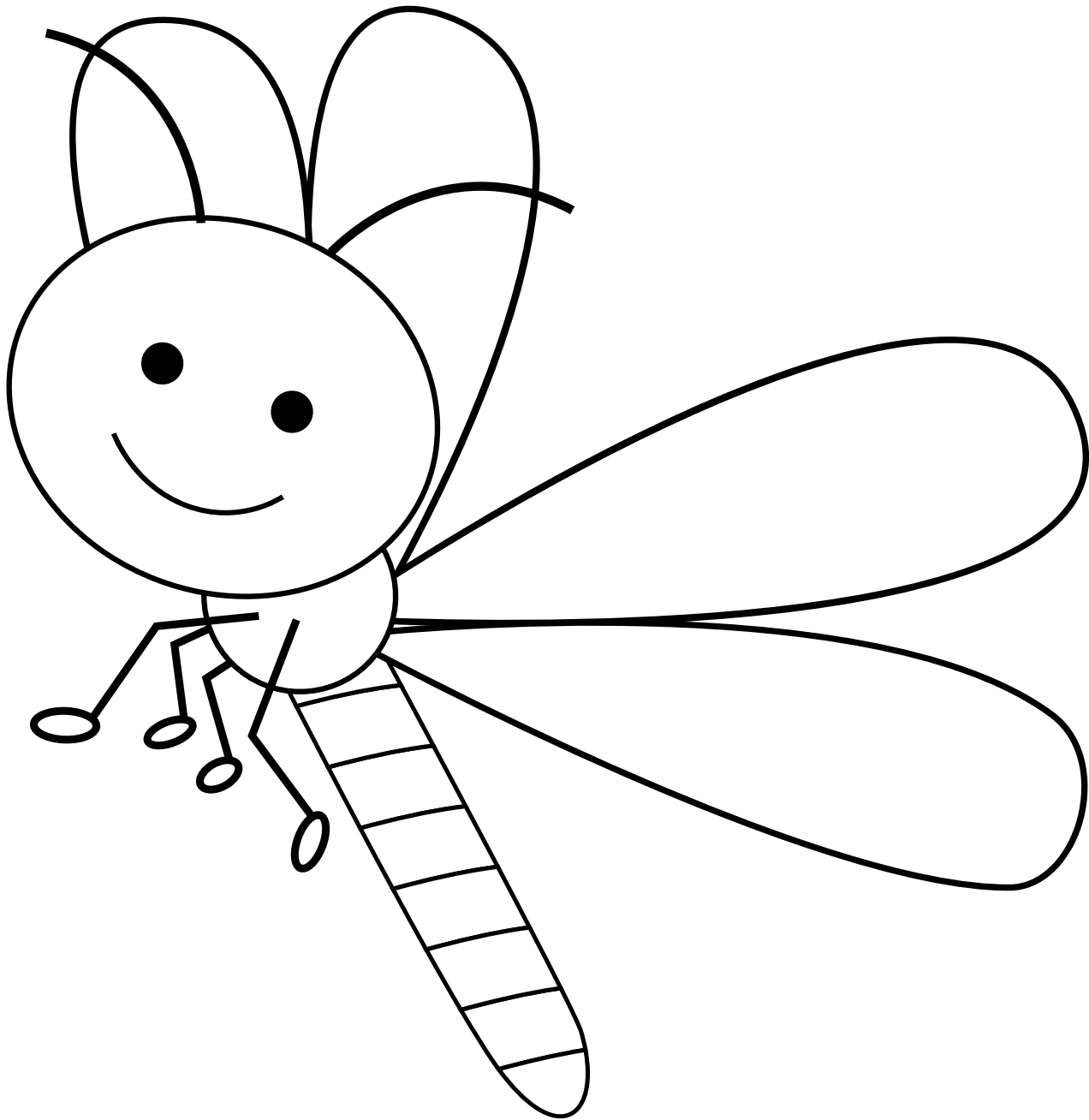


Caterpillar

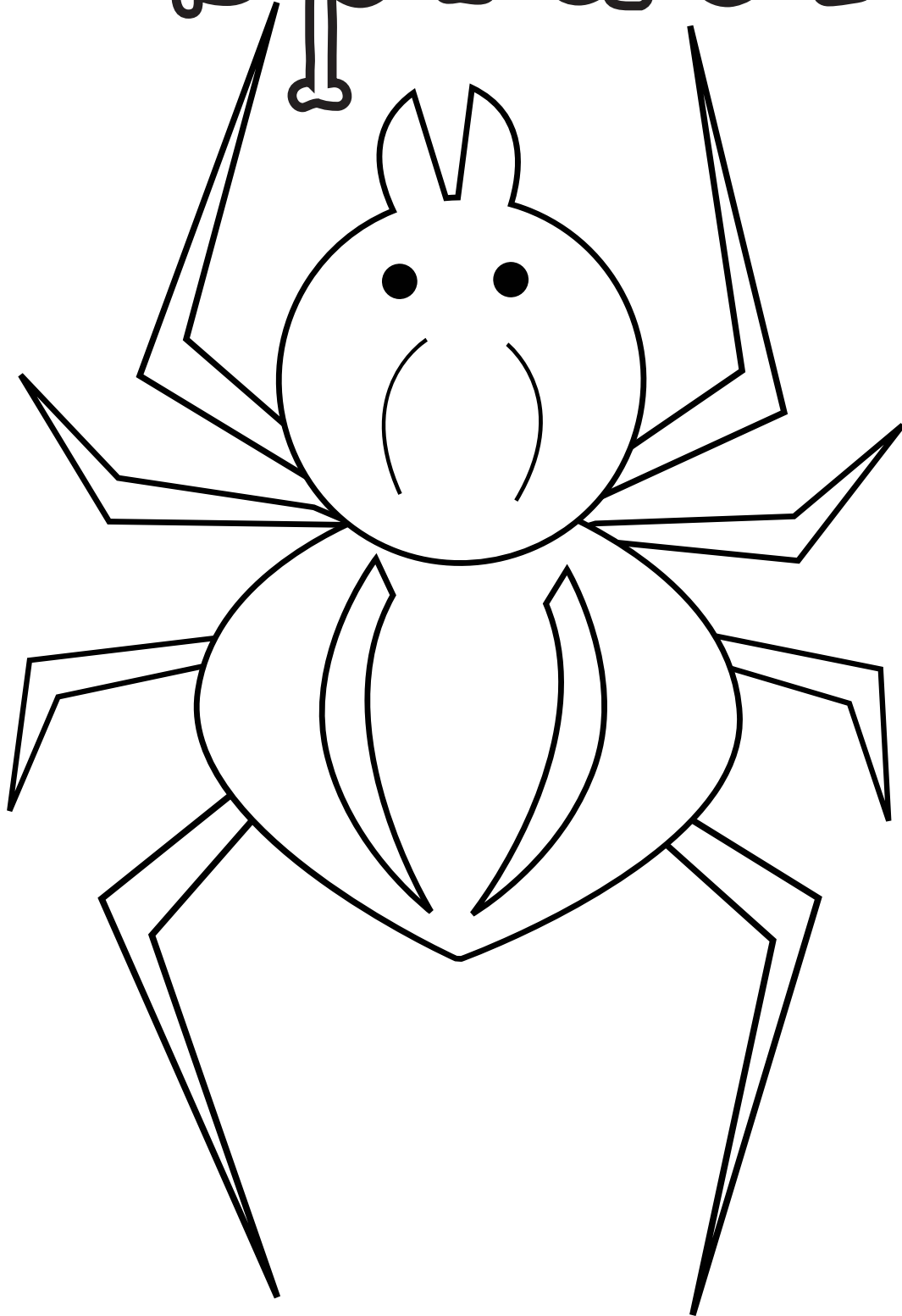
Grasshopper



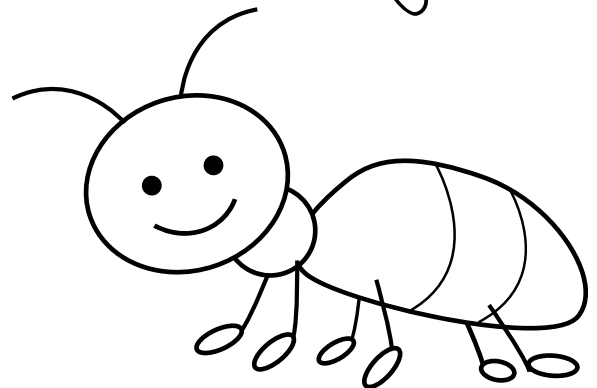
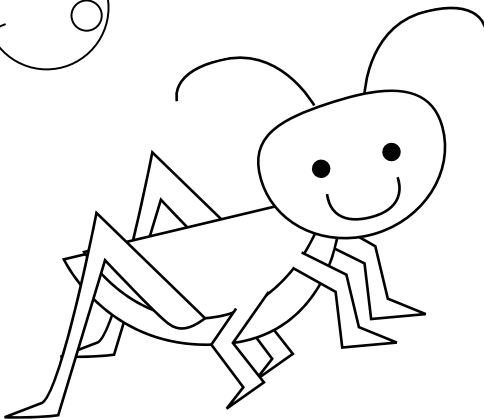
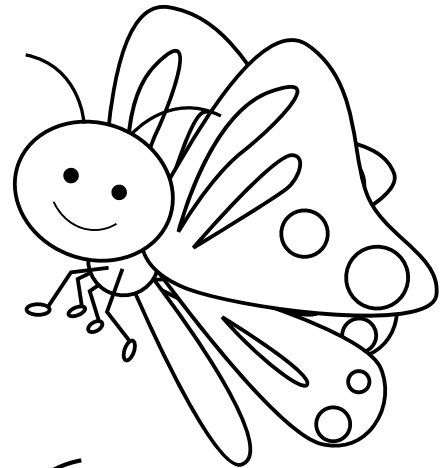
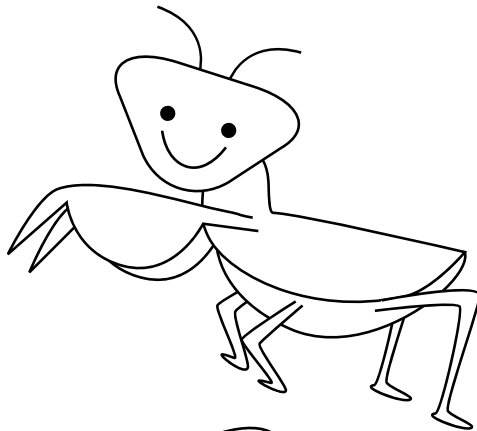
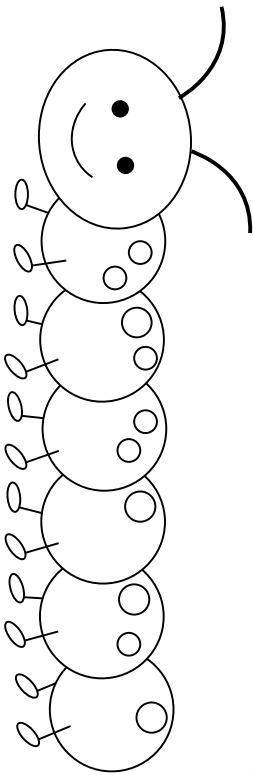
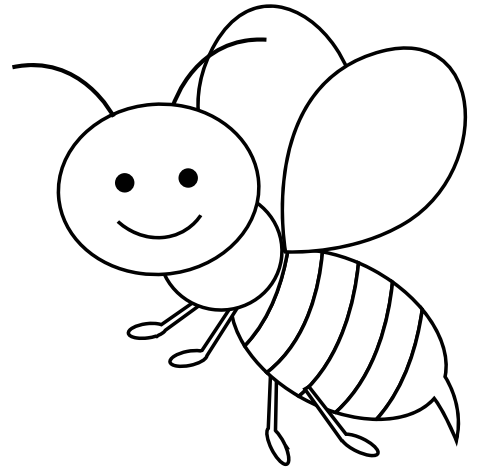
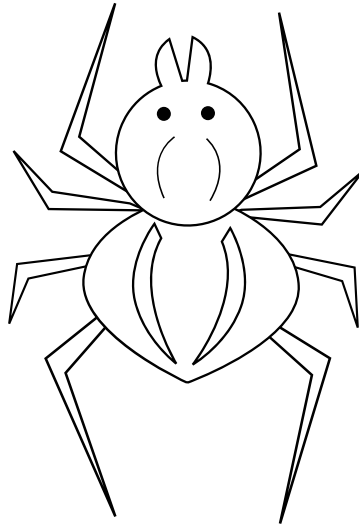
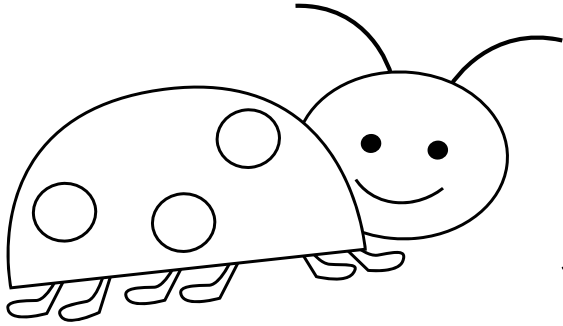
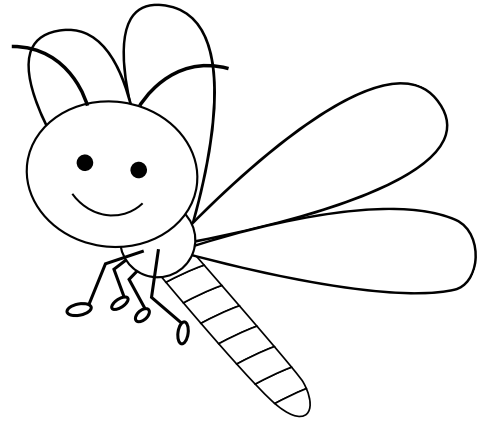
Dragonfly



Spider

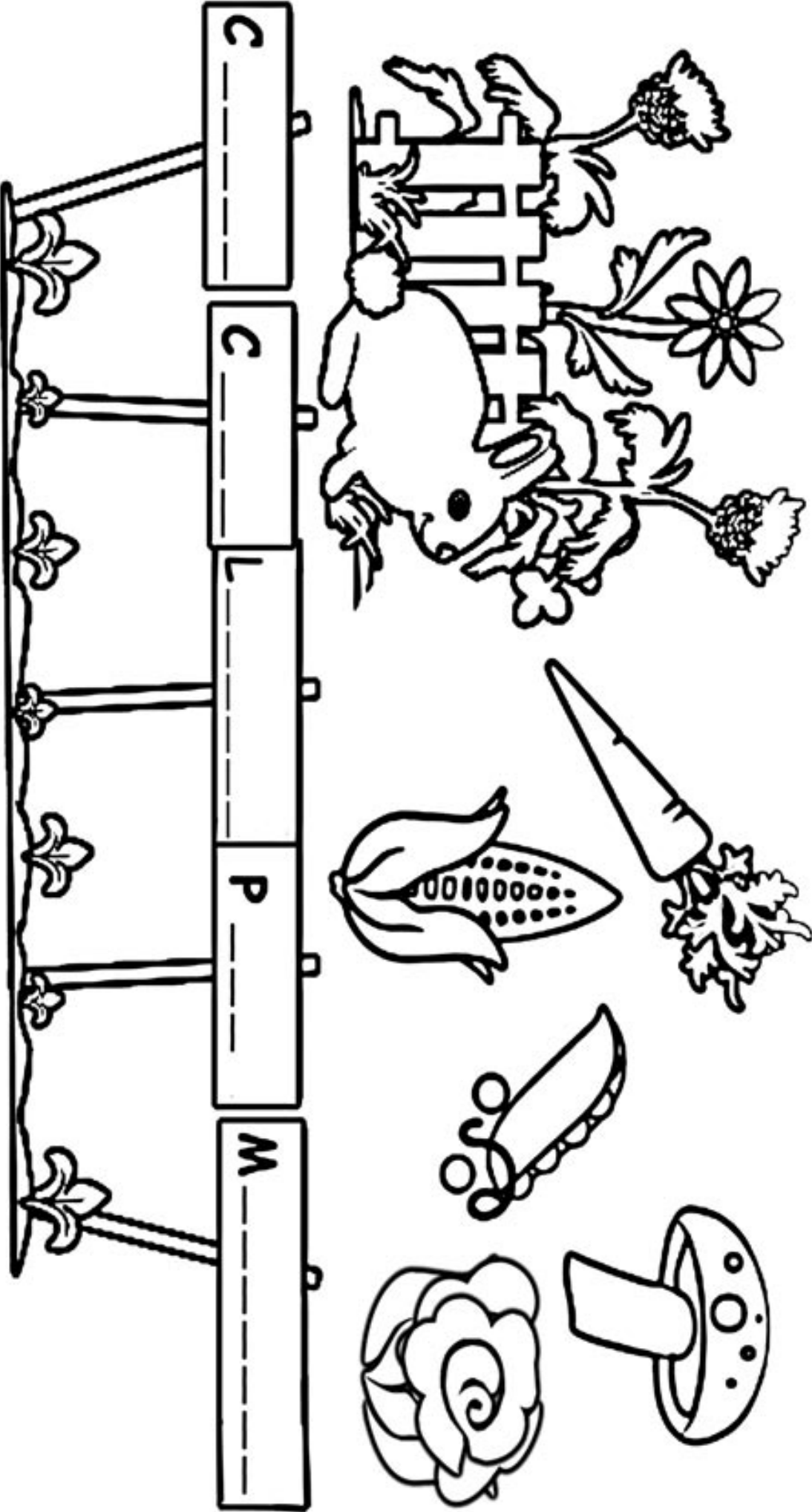


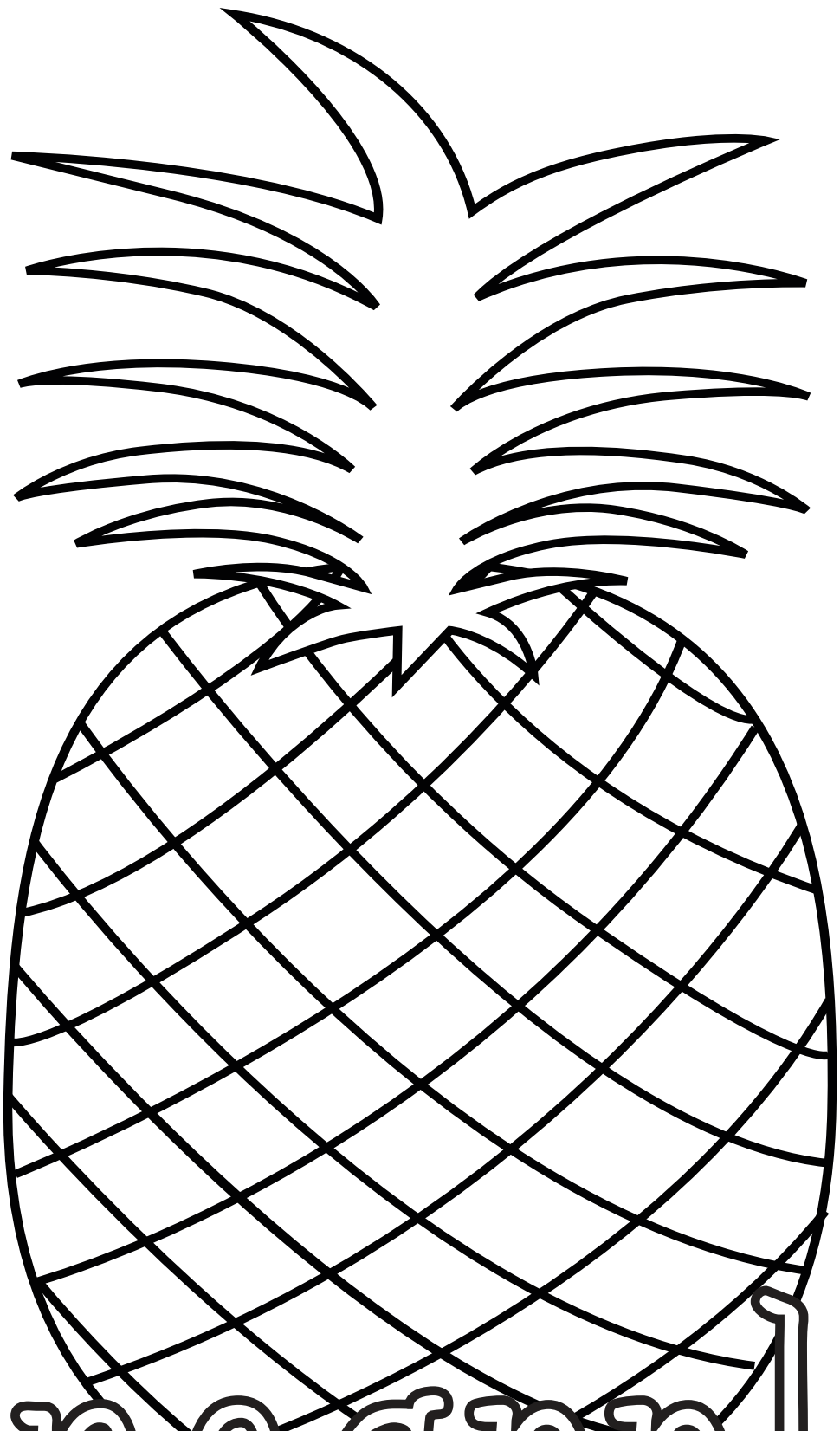
Bugs



Help Hops the bunny label his garden signs by spelling out the names of the vegetables.

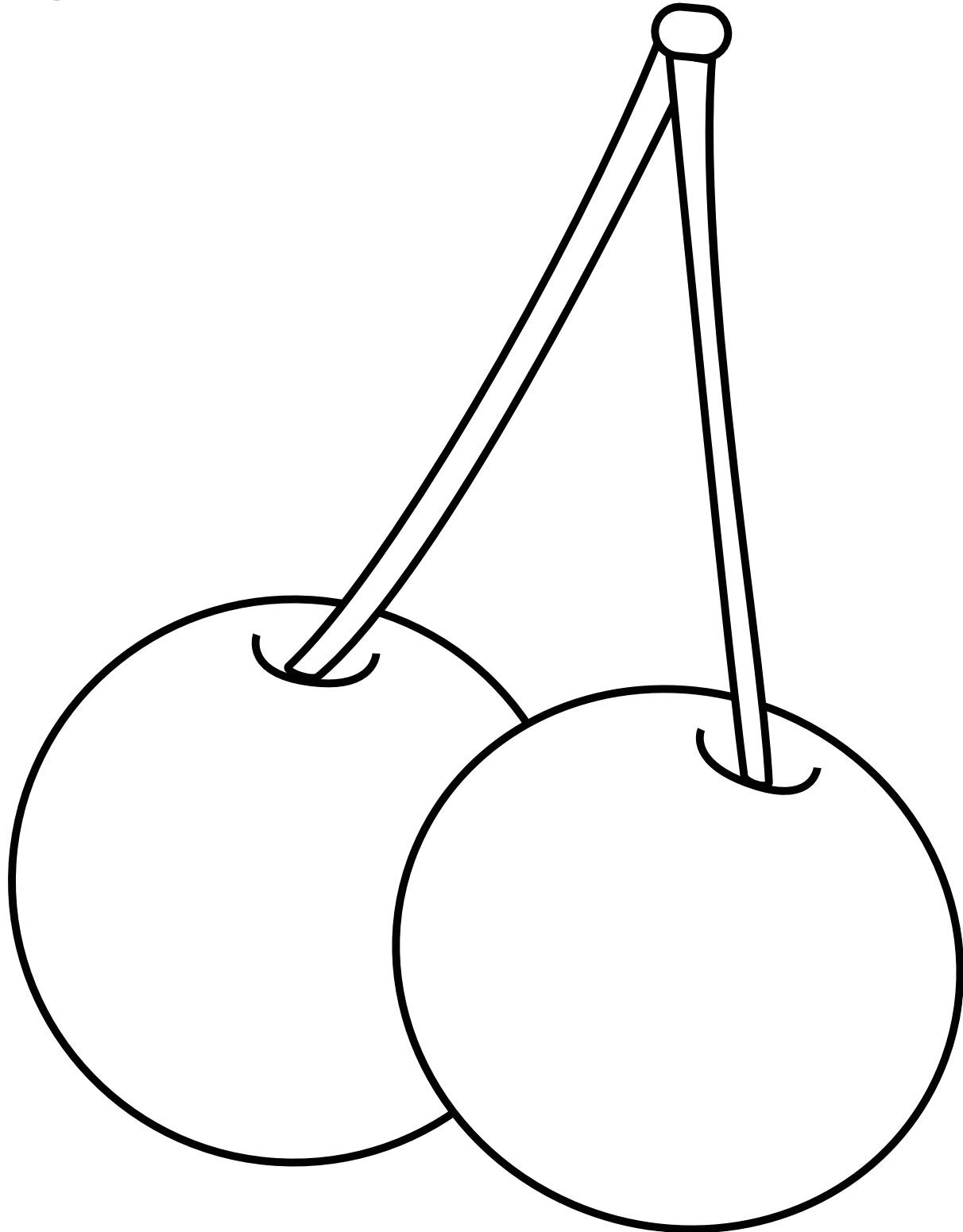
How many vegetables do you see? ___



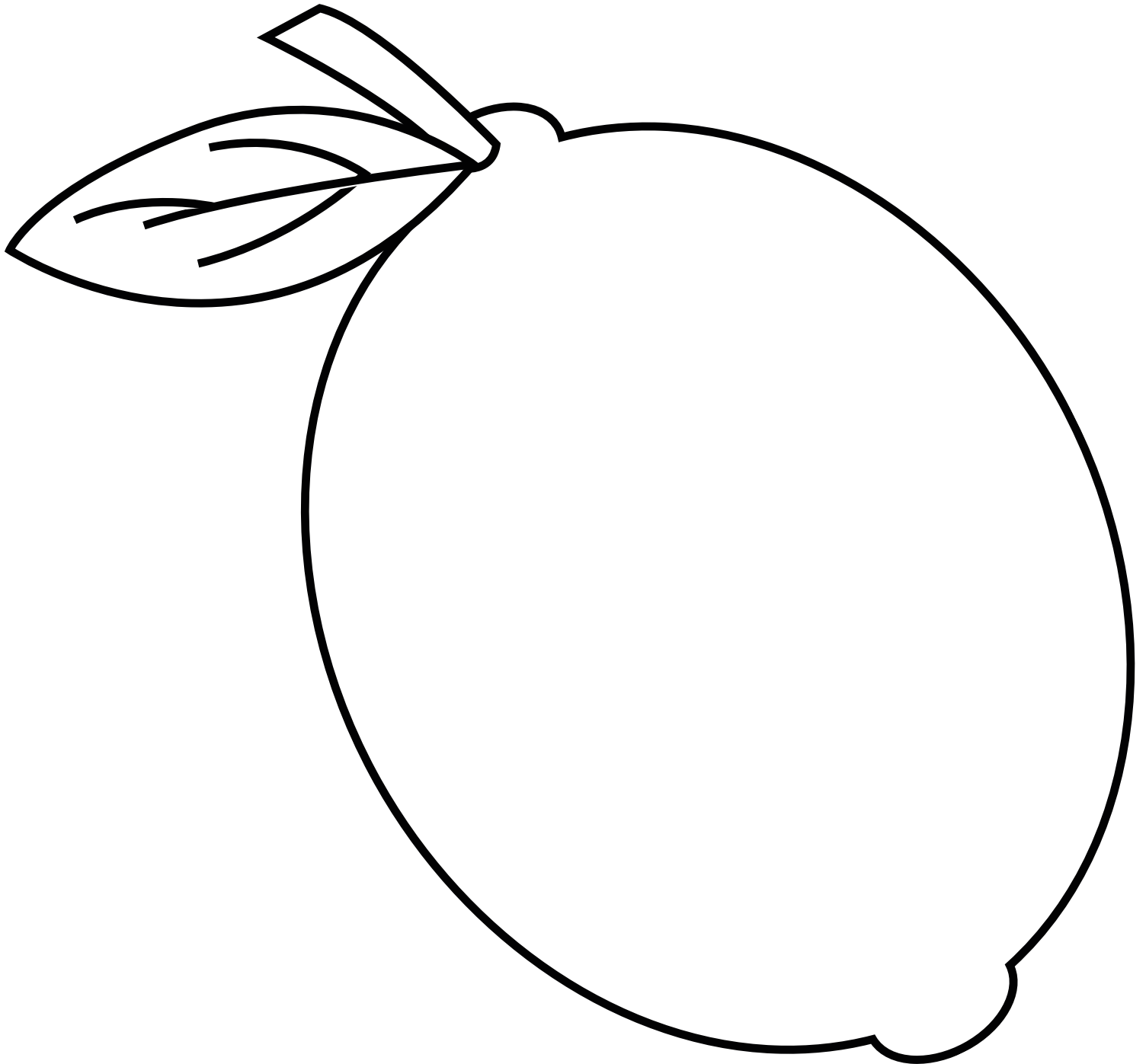


Pineapple

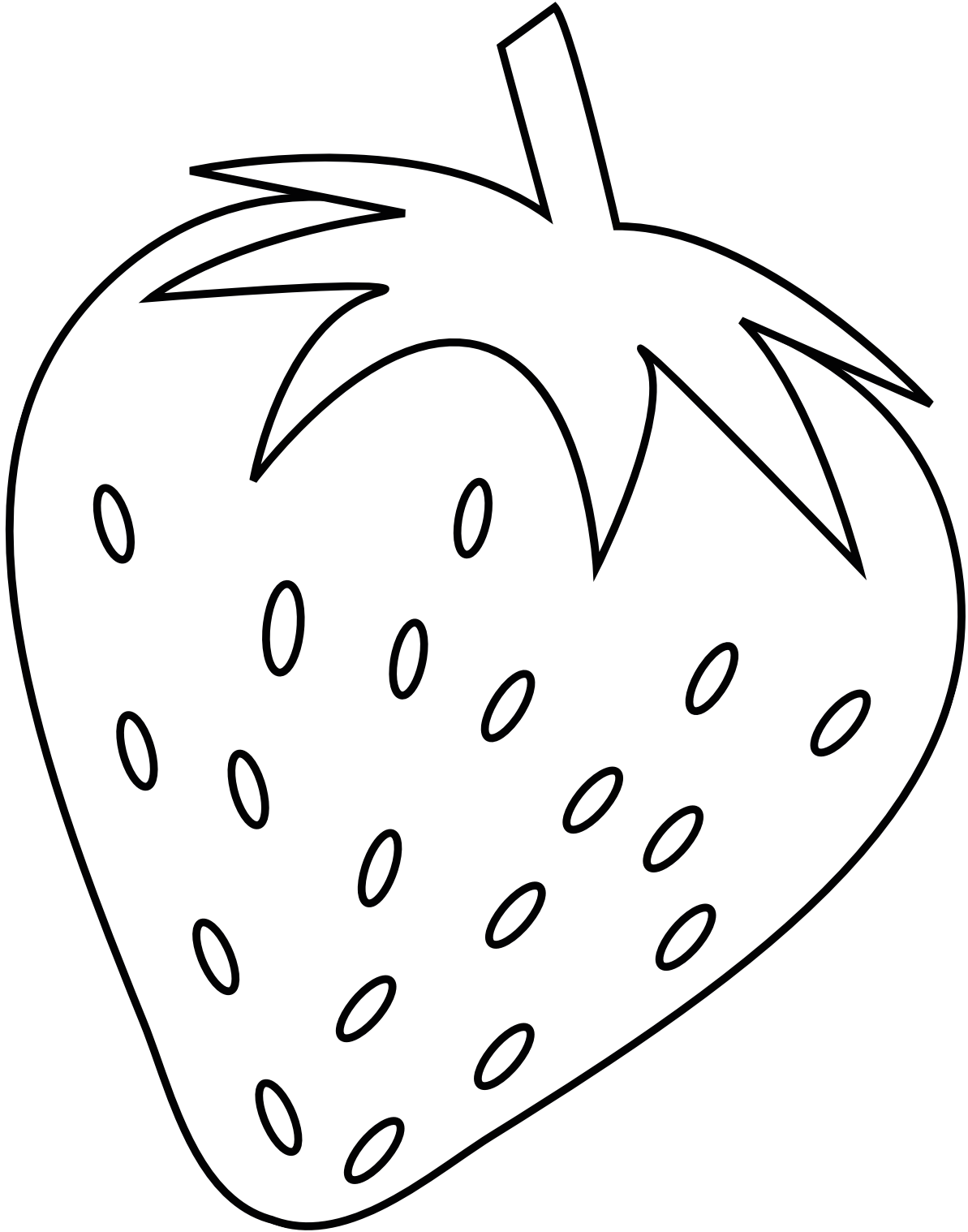
Cherries



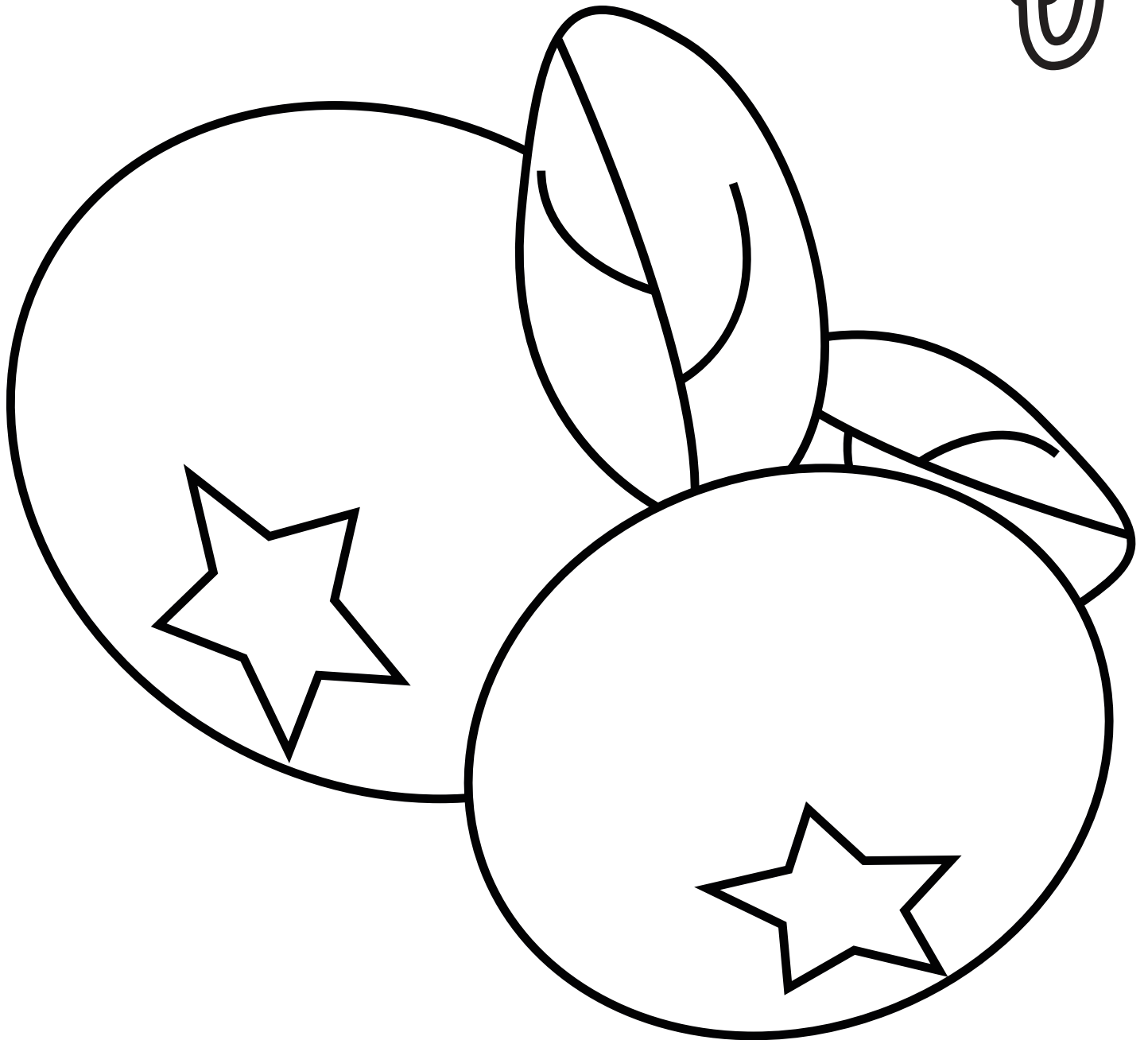
Lemon



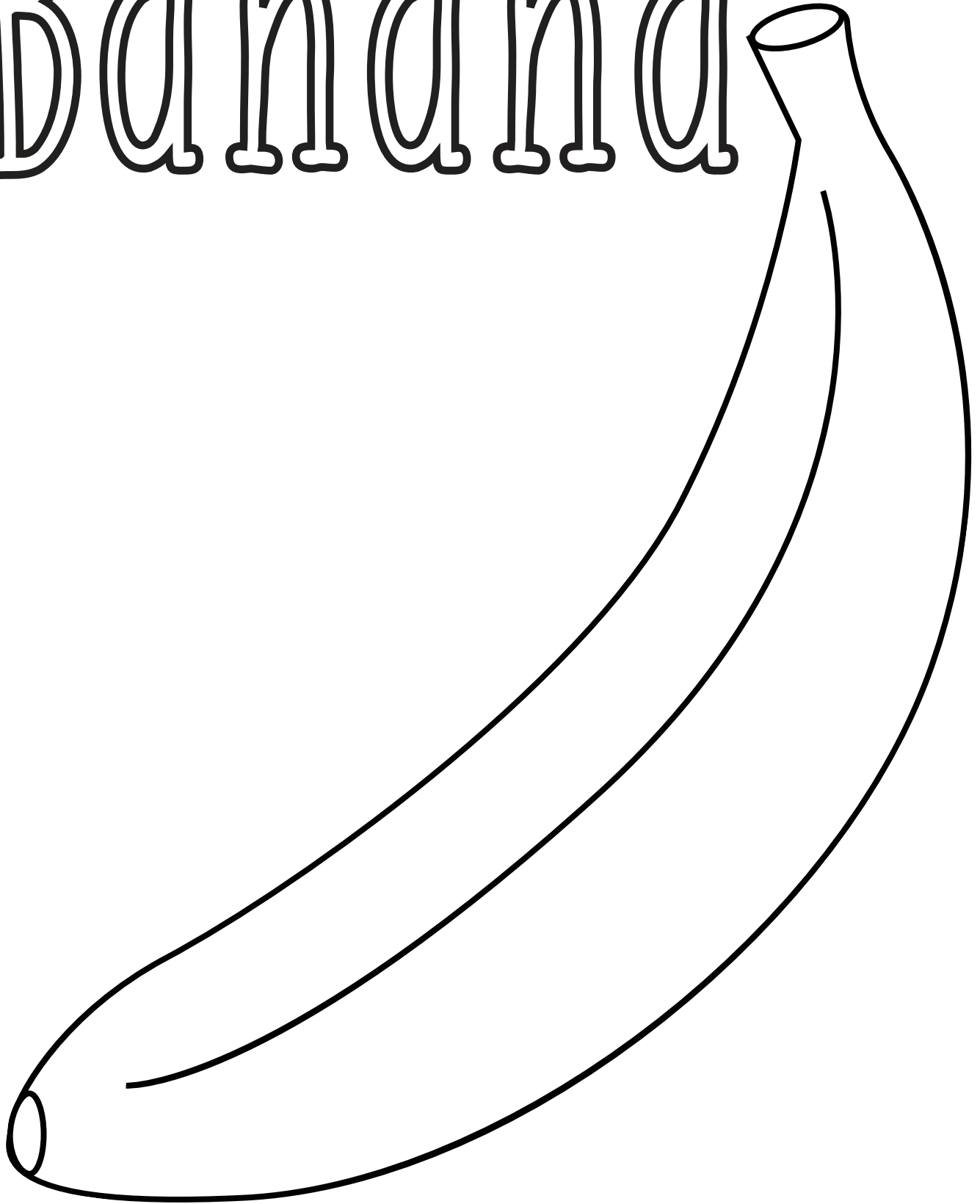
Strawberry



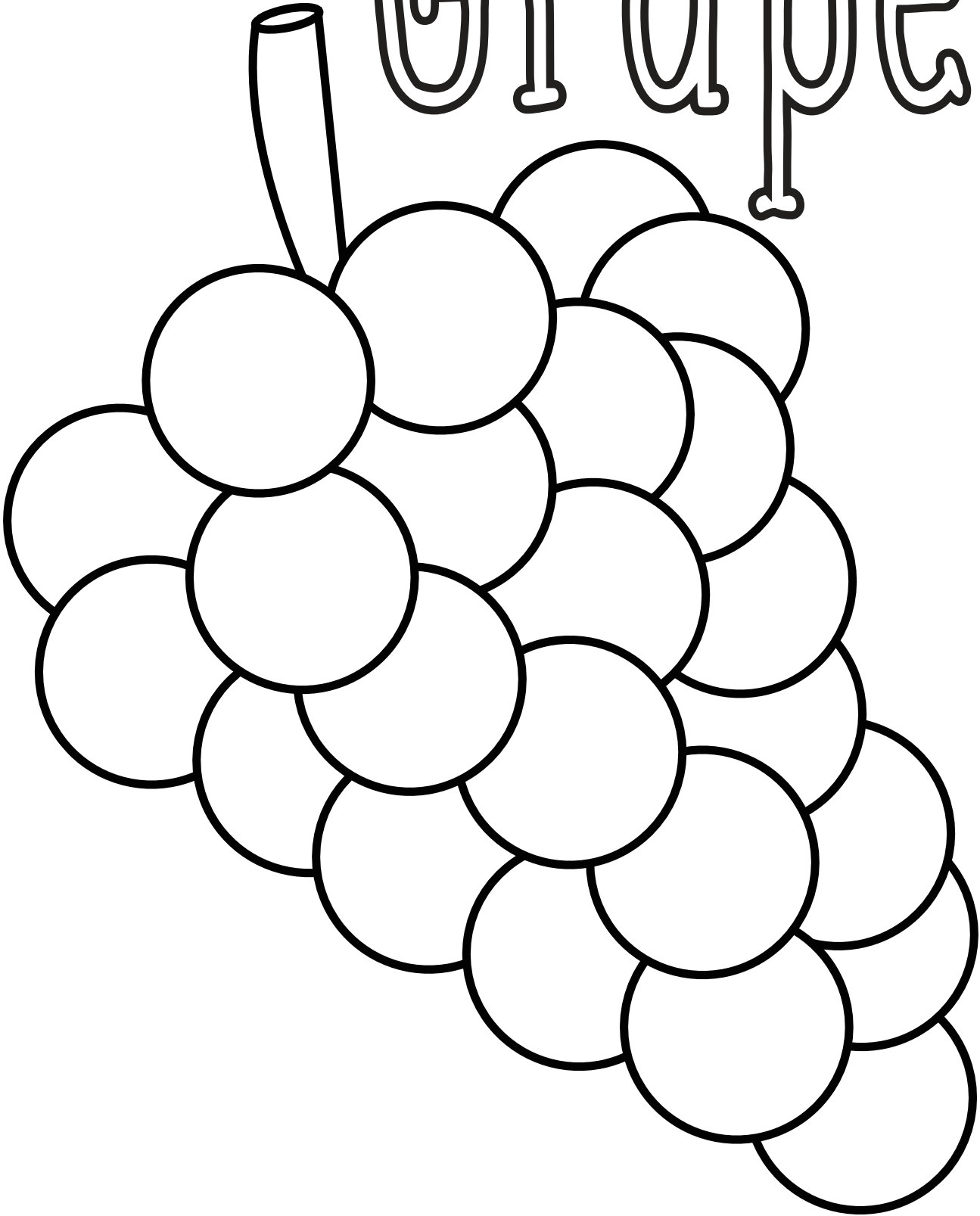
Blueberry



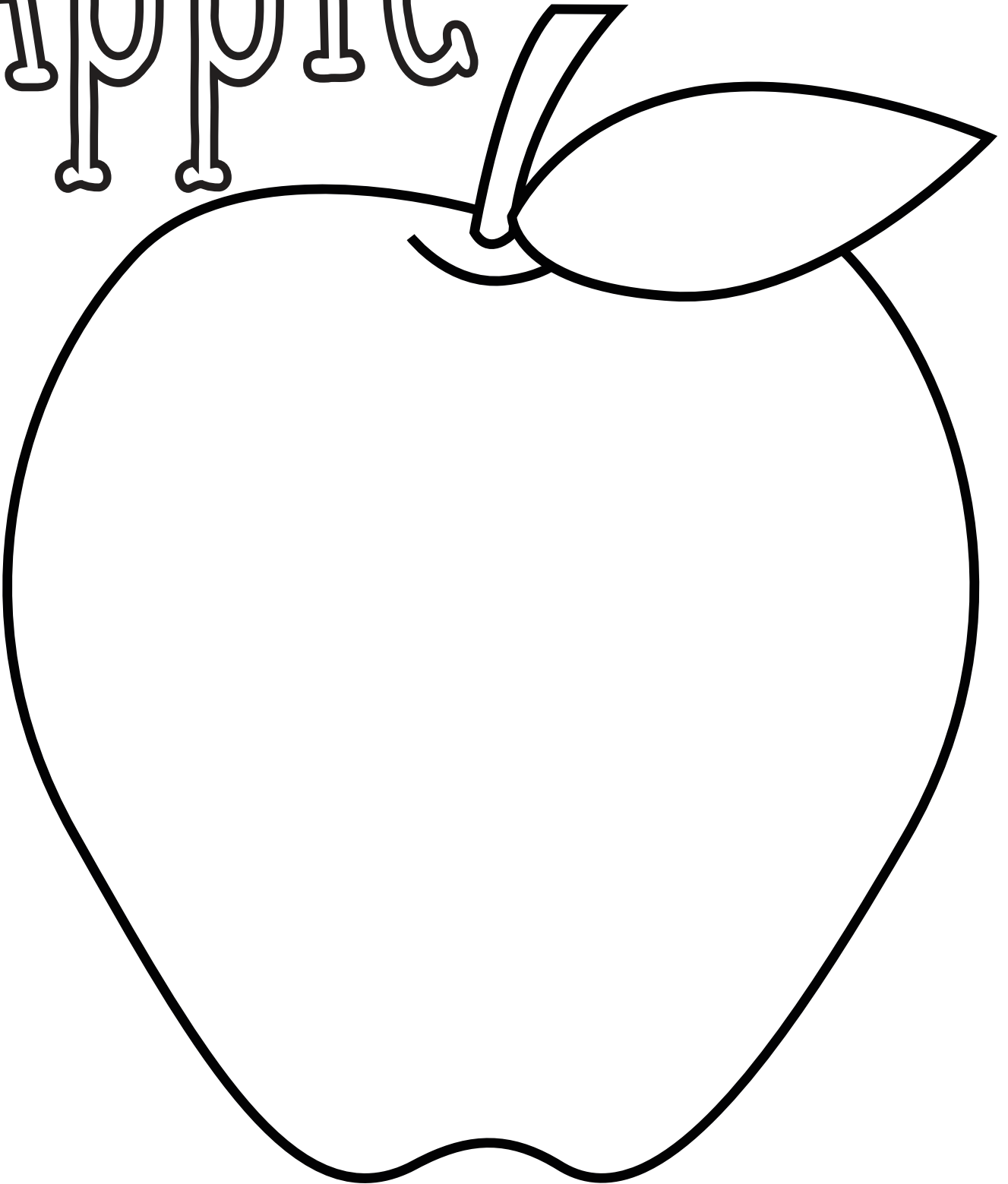
Banana



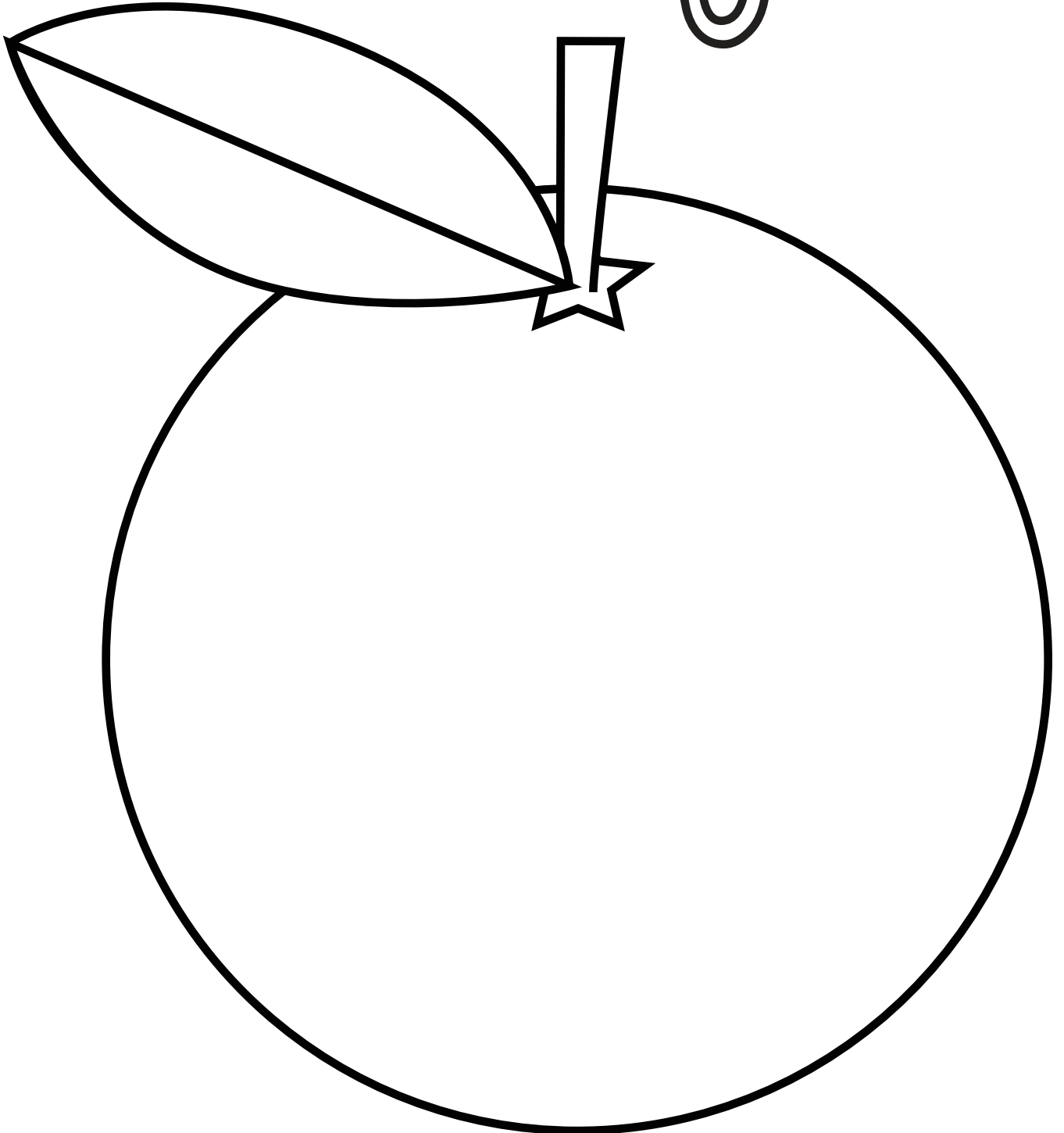
Grapes



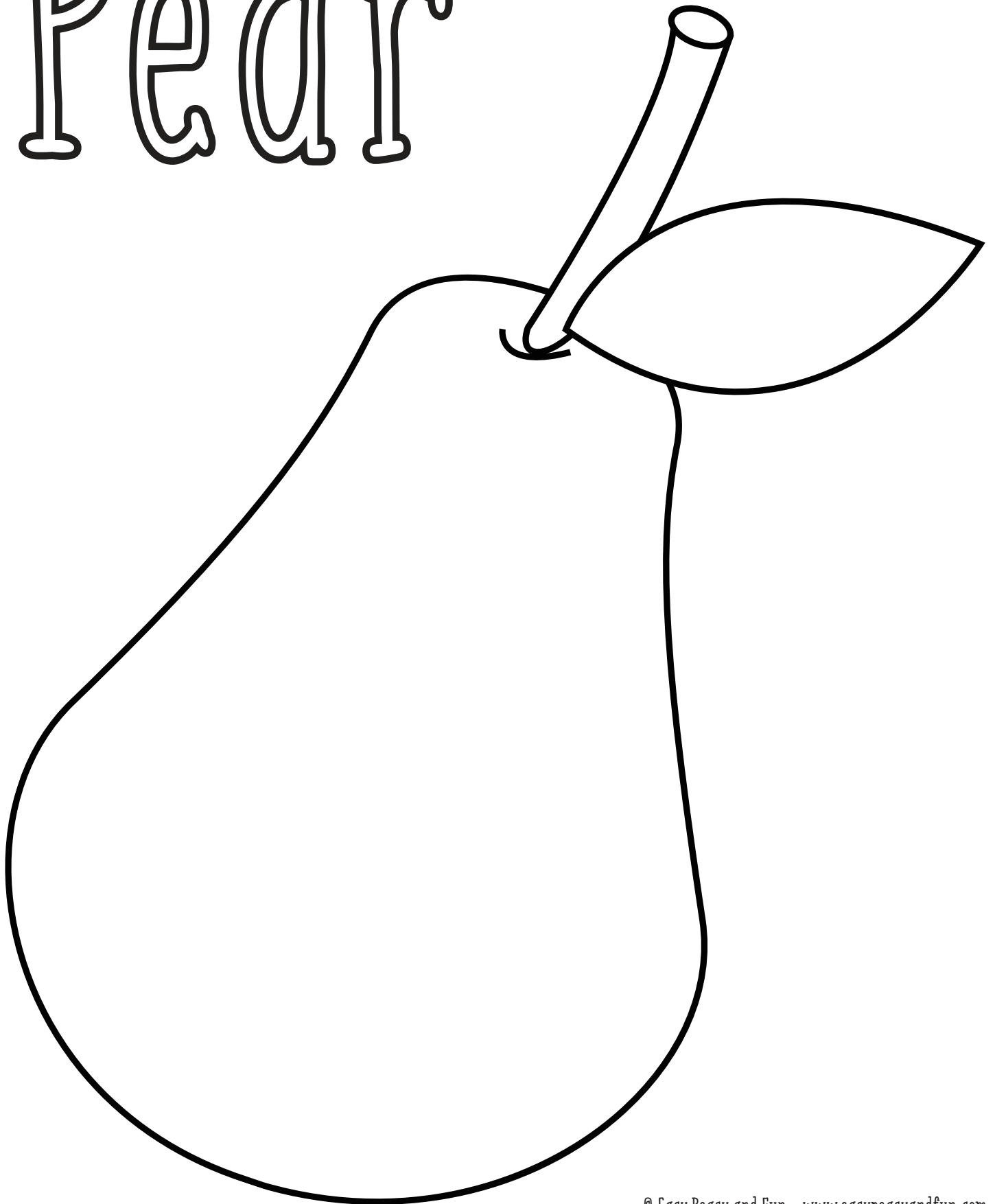
Apple



Orange

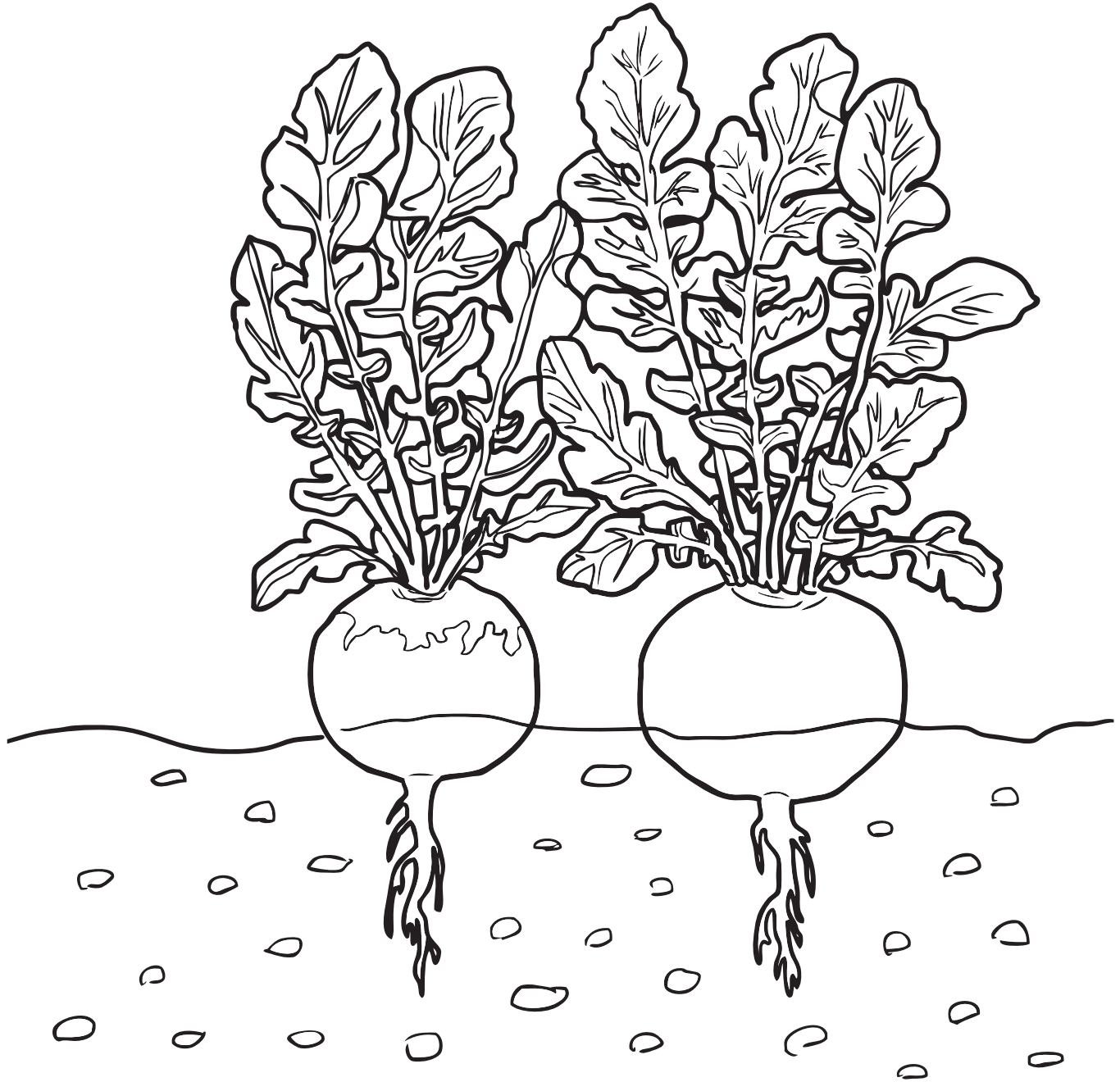


Pear





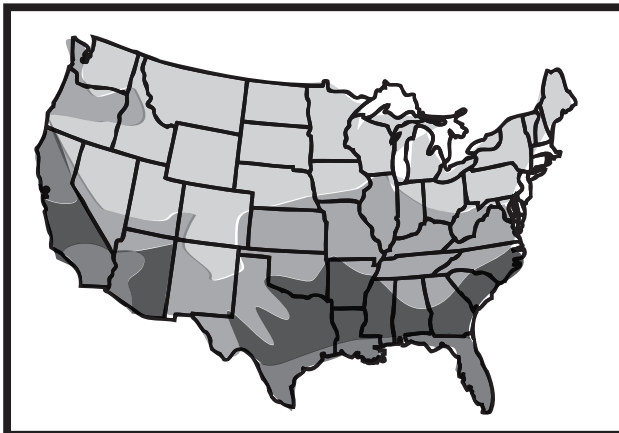
RADISH



PLANTING GUIDE

April – July		March – May & August	
Feb – April & Aug – Oct		September – May	
Days to Germination	Days to Harvest	Planting Depth	Spacing Row / Plant
4 - 7	28	1/2 in.	12 in. / 1 in.

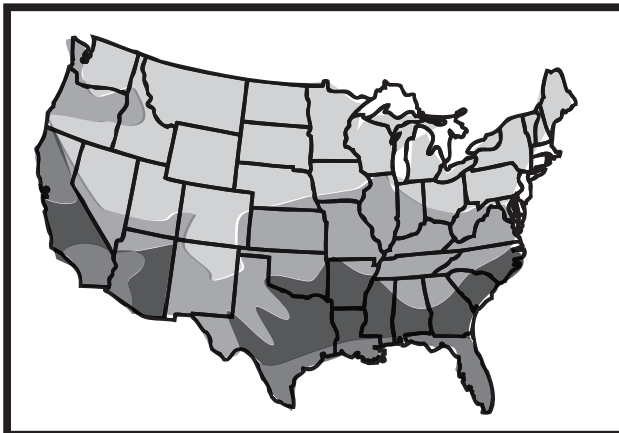
TOMATOES



PLANTING GUIDE

May – June		April – June	
March – May		March – May	
Days to Germination	Days to Harvest	Planting Depth	Spacing Row / Plant
7 – 10	7 – 75	1/4 in.	3 ft. / 2 ft.

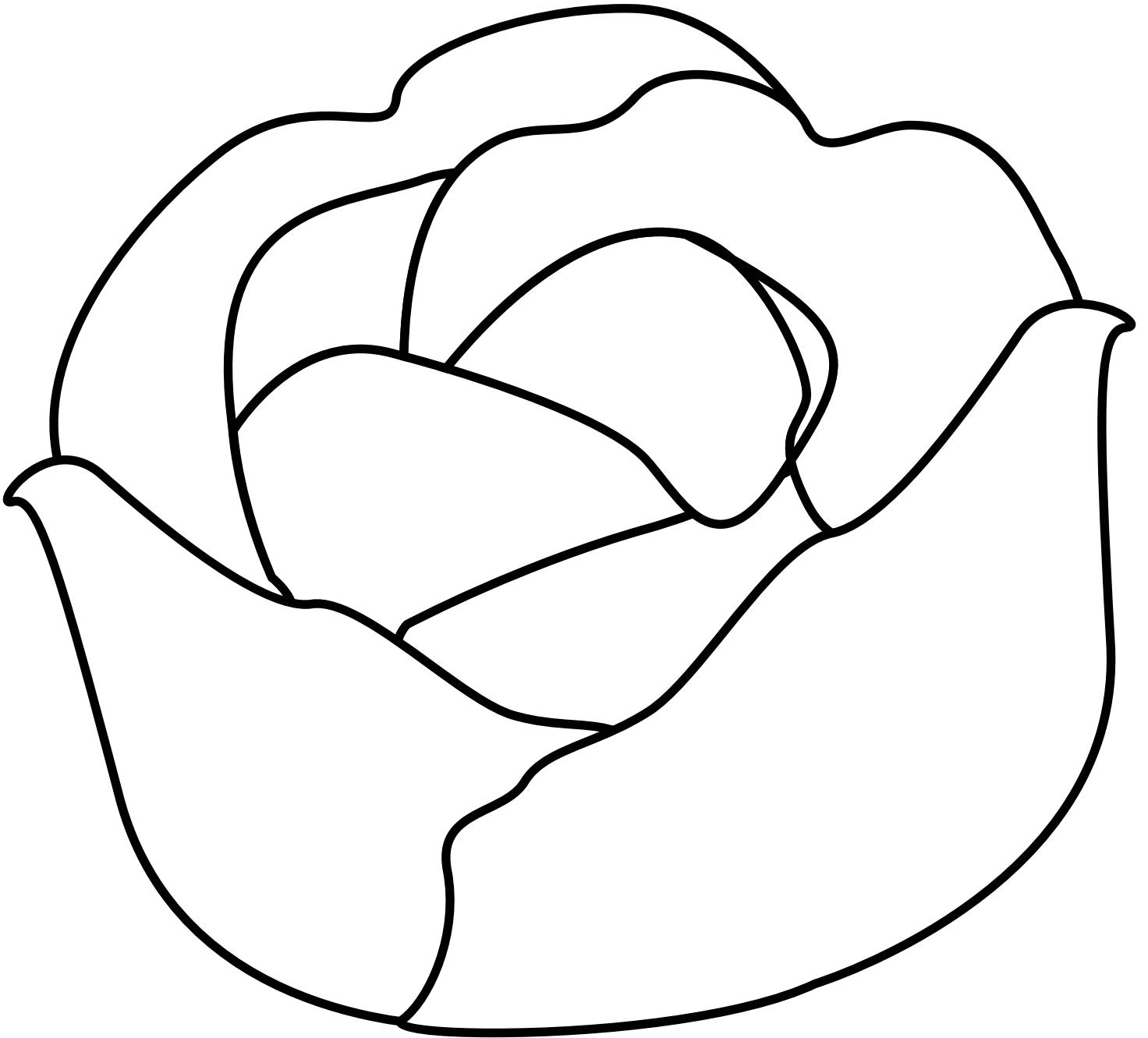
WATERMELON



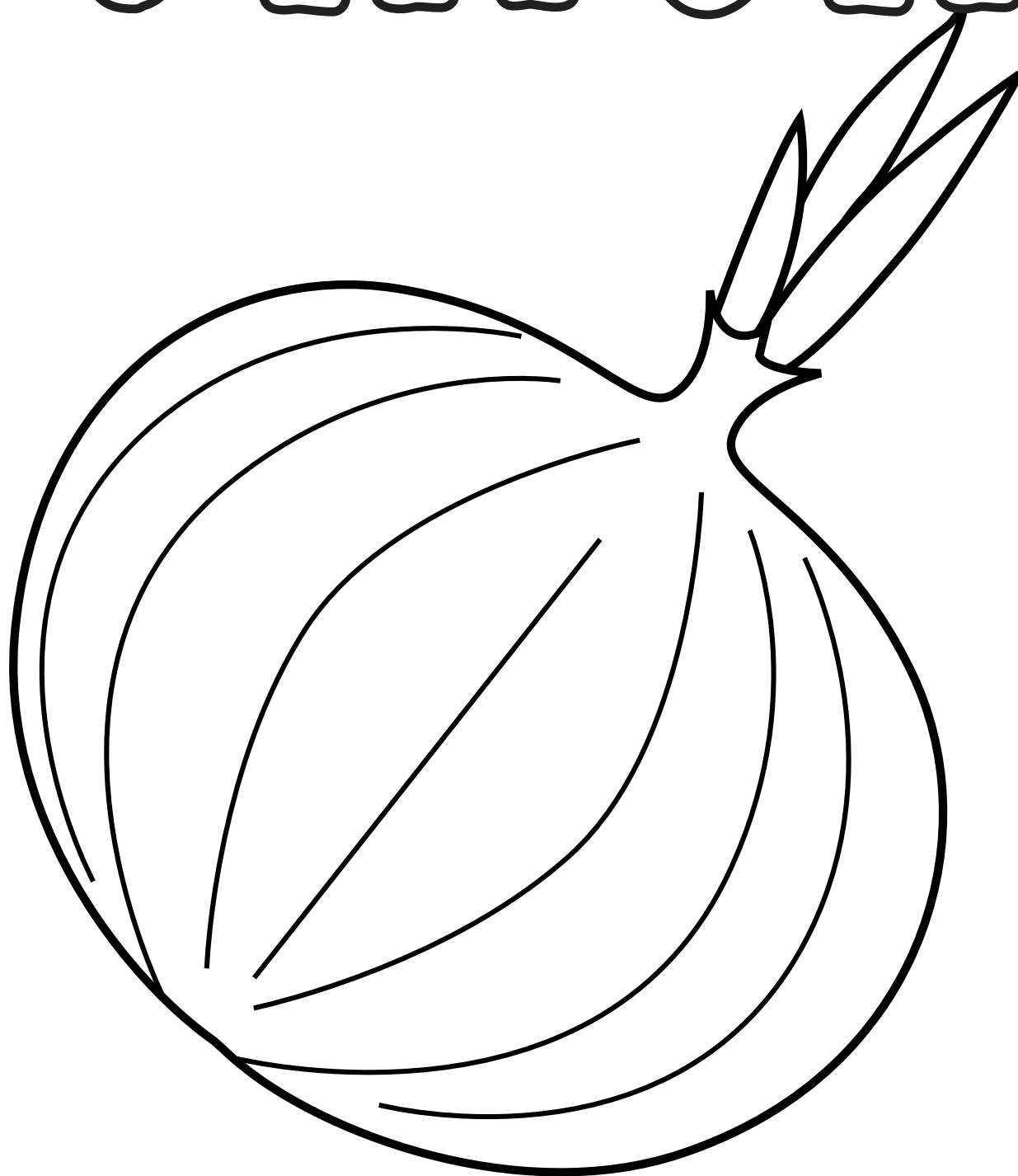
PLANTING GUIDE

June		May – June	
April – June		April – June	
Days to Germination	Days to Harvest	Planting Depth	Spacing Row / Plant
6 – 8	85	1/2 in.	5 ft. / 6 ft.

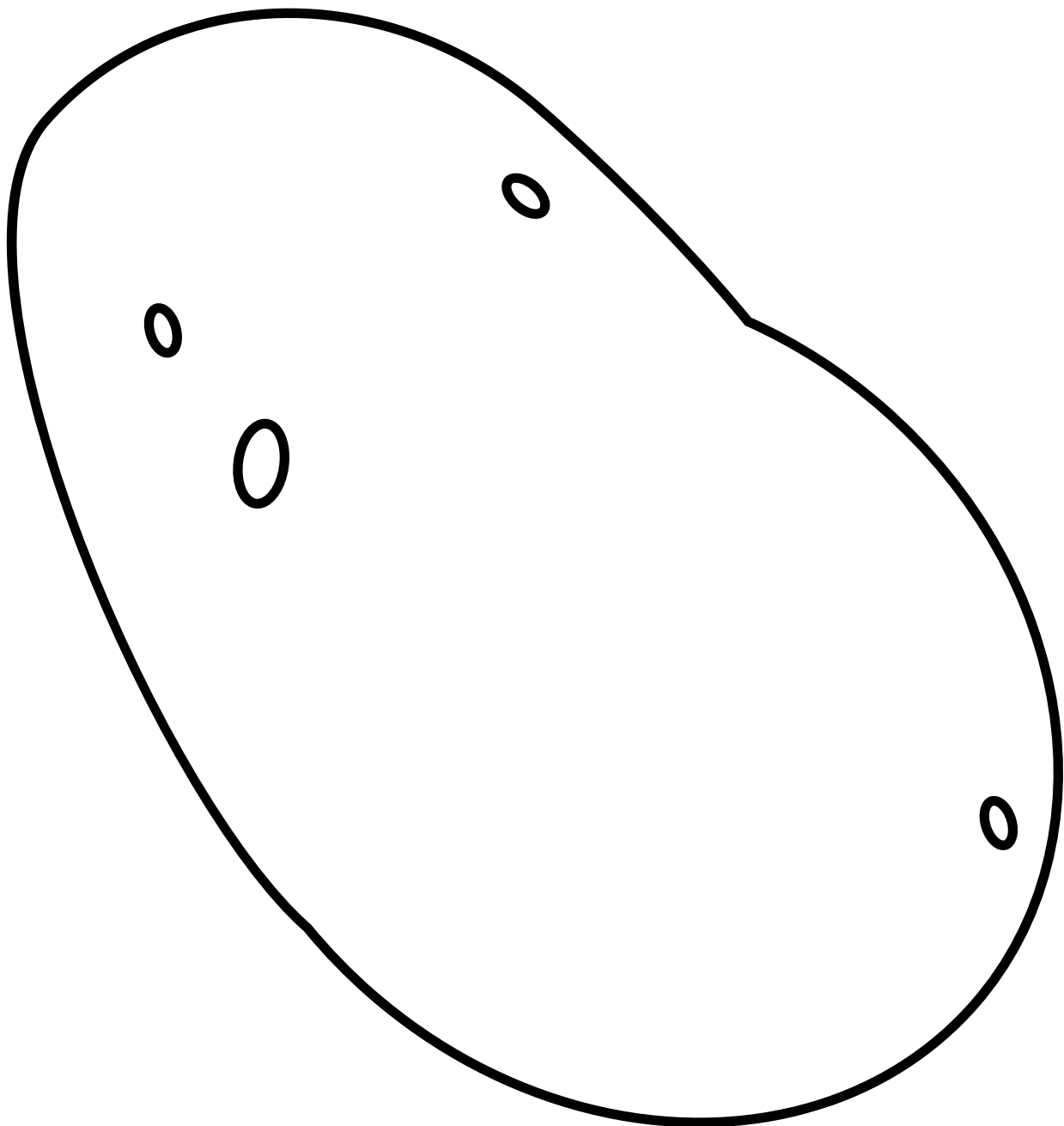
Lettuce



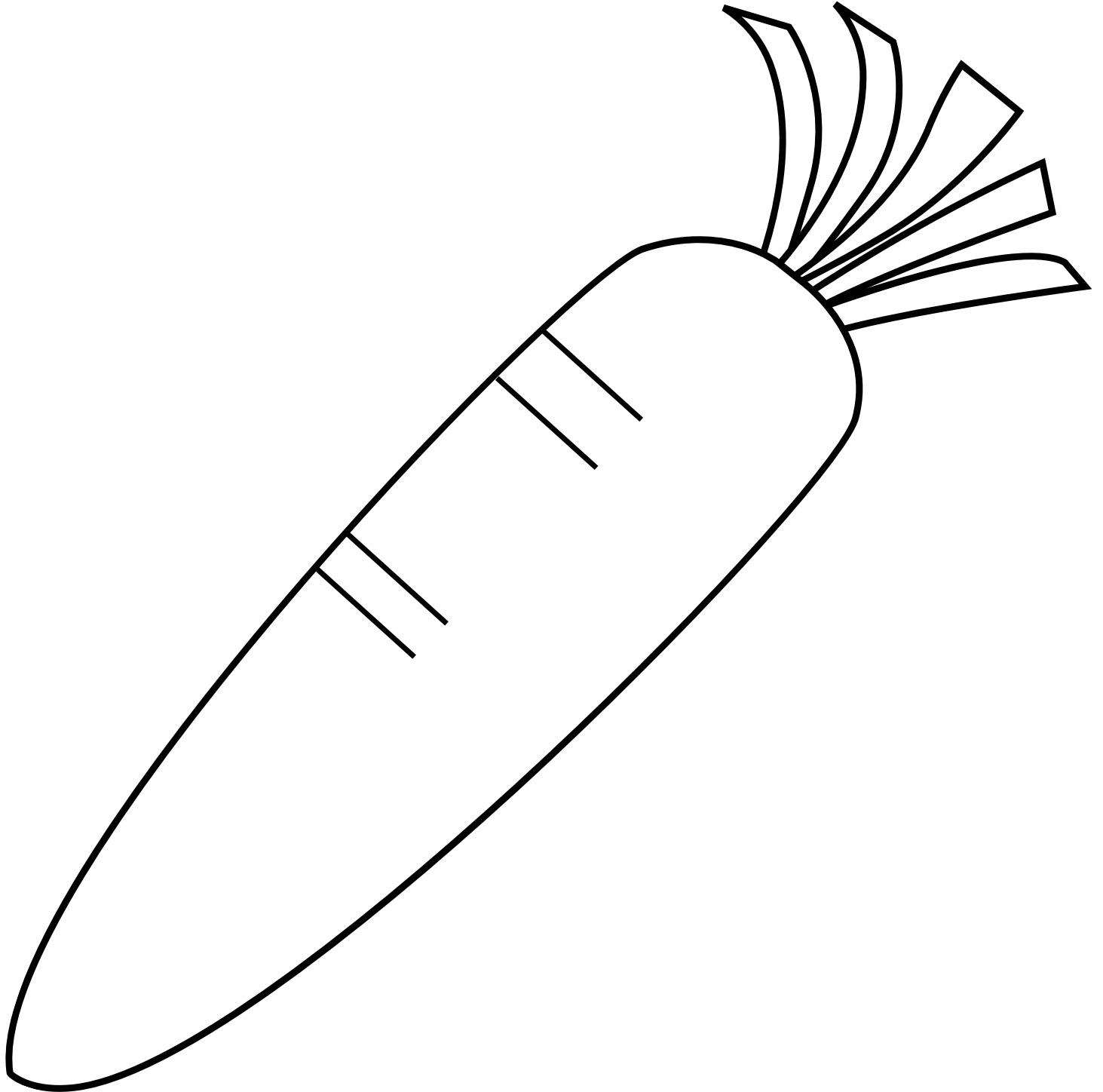
Onion



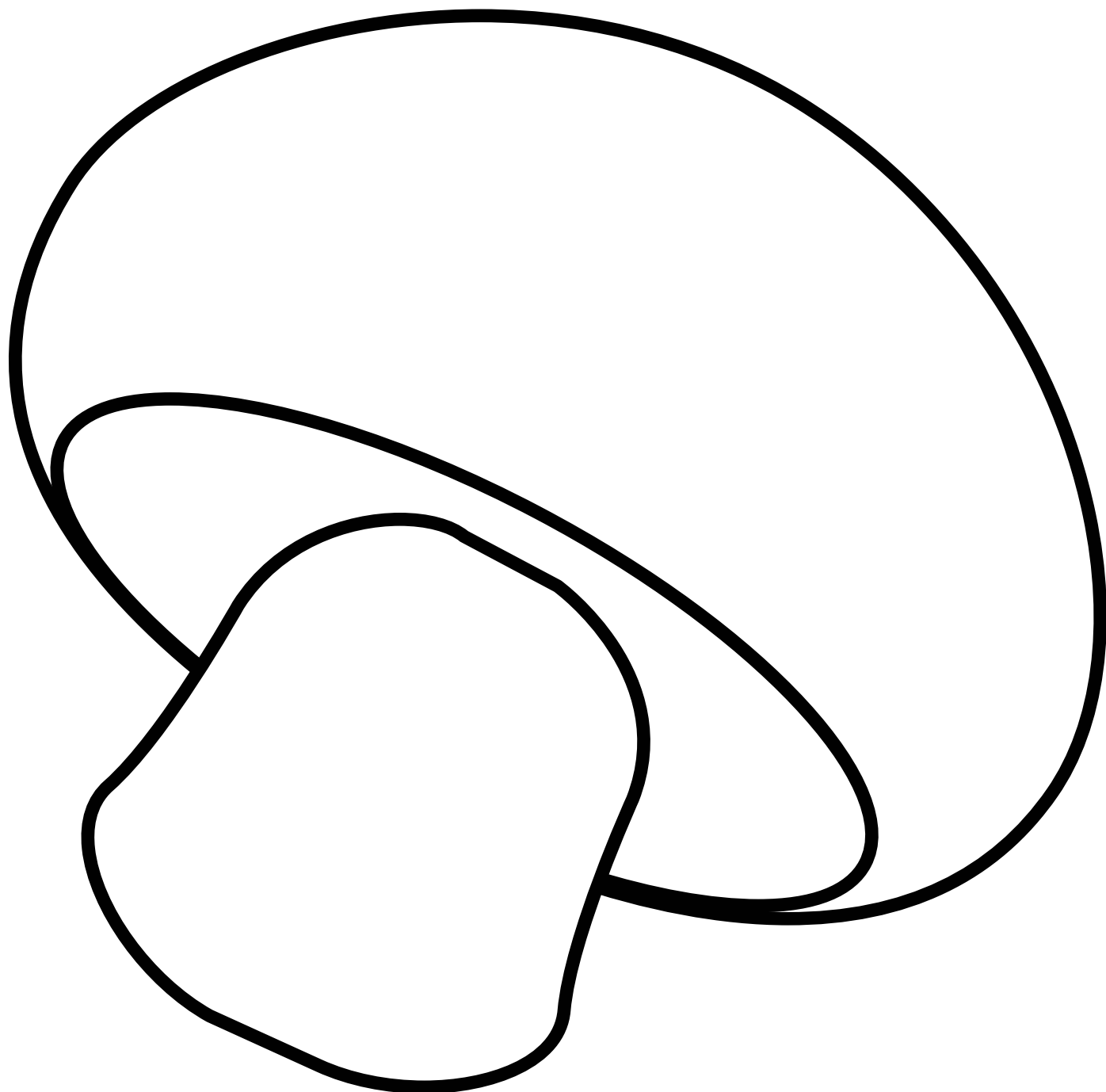
Potato



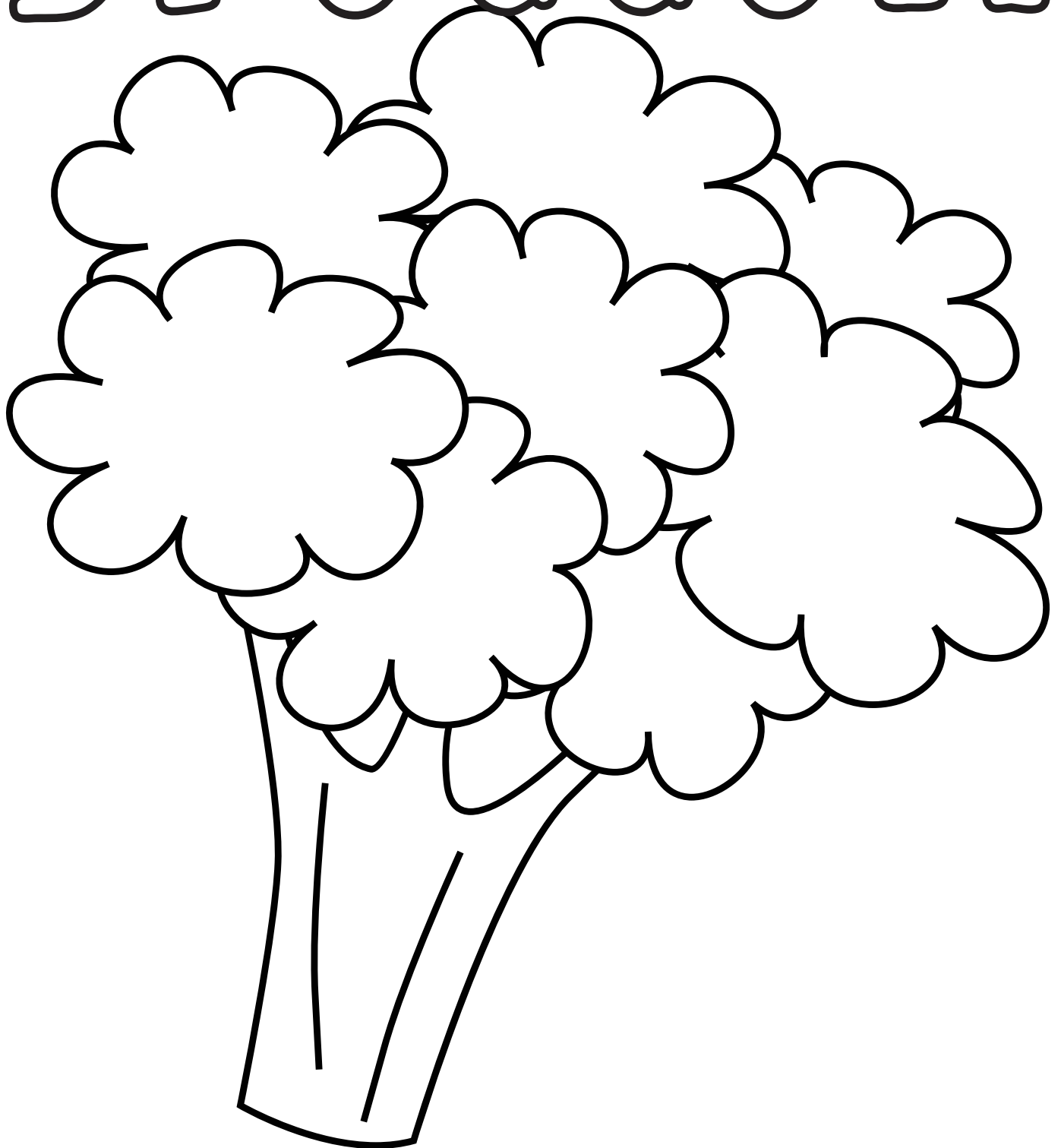
Carrot



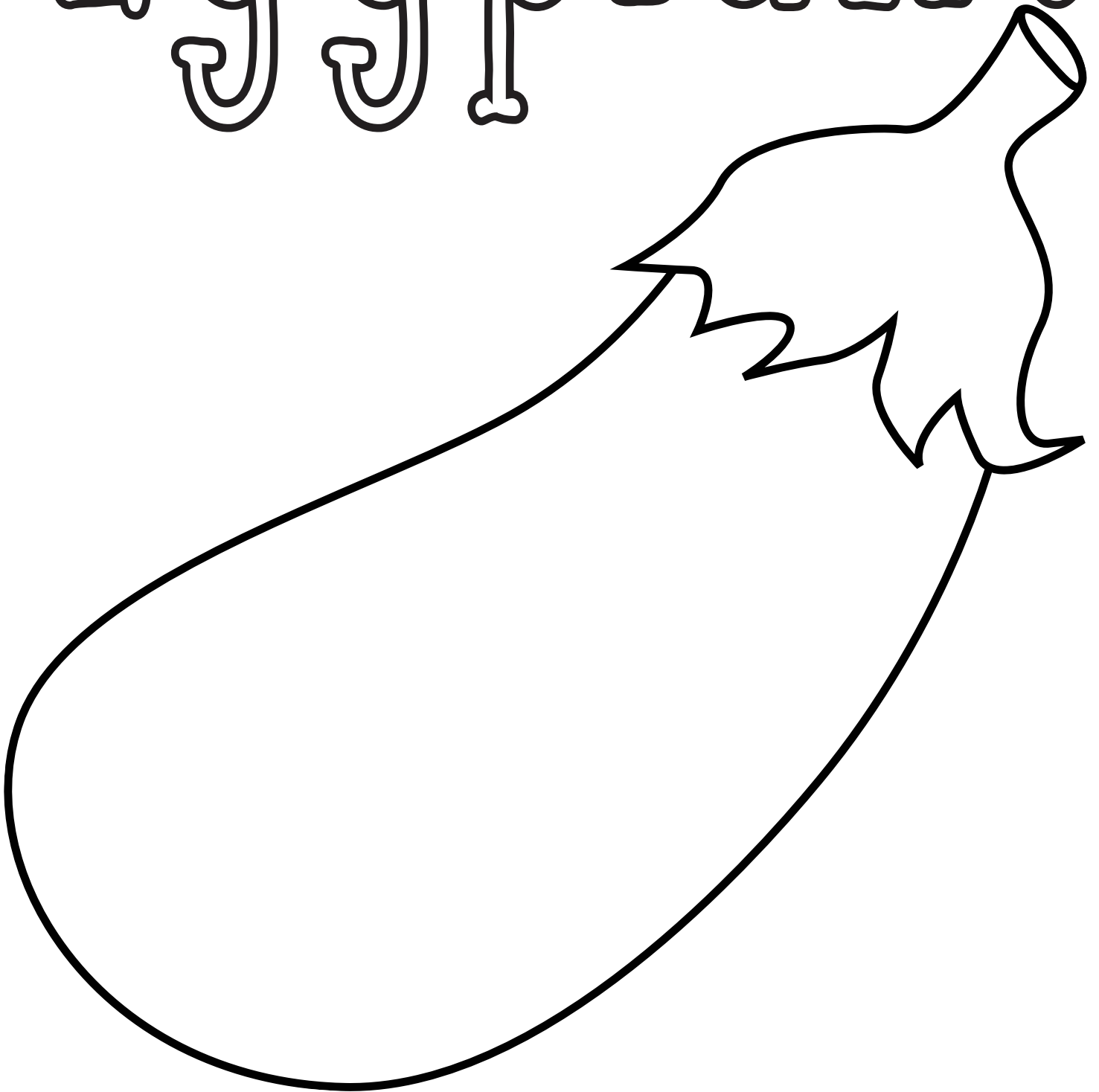
Mushroom



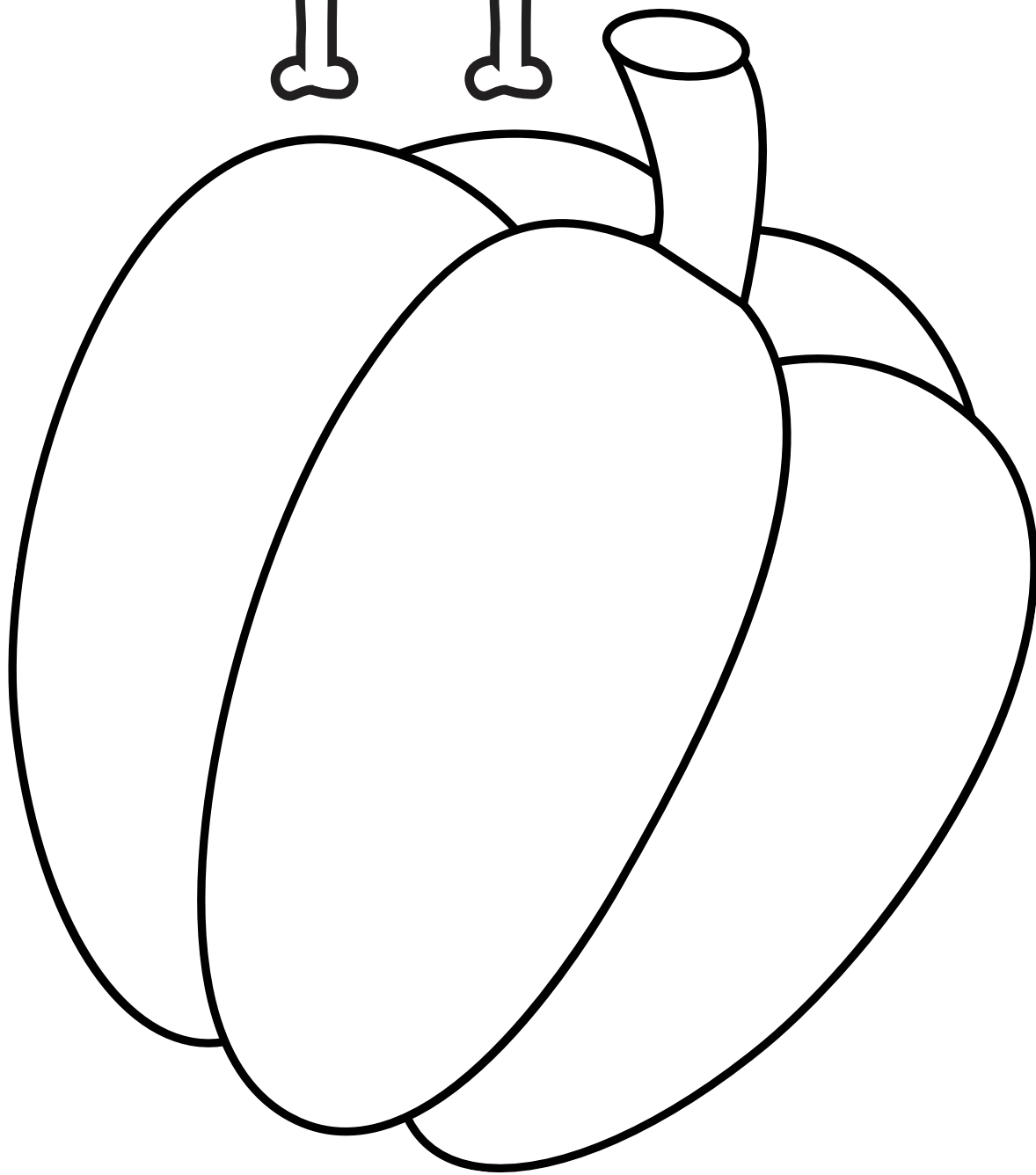
Broccoli



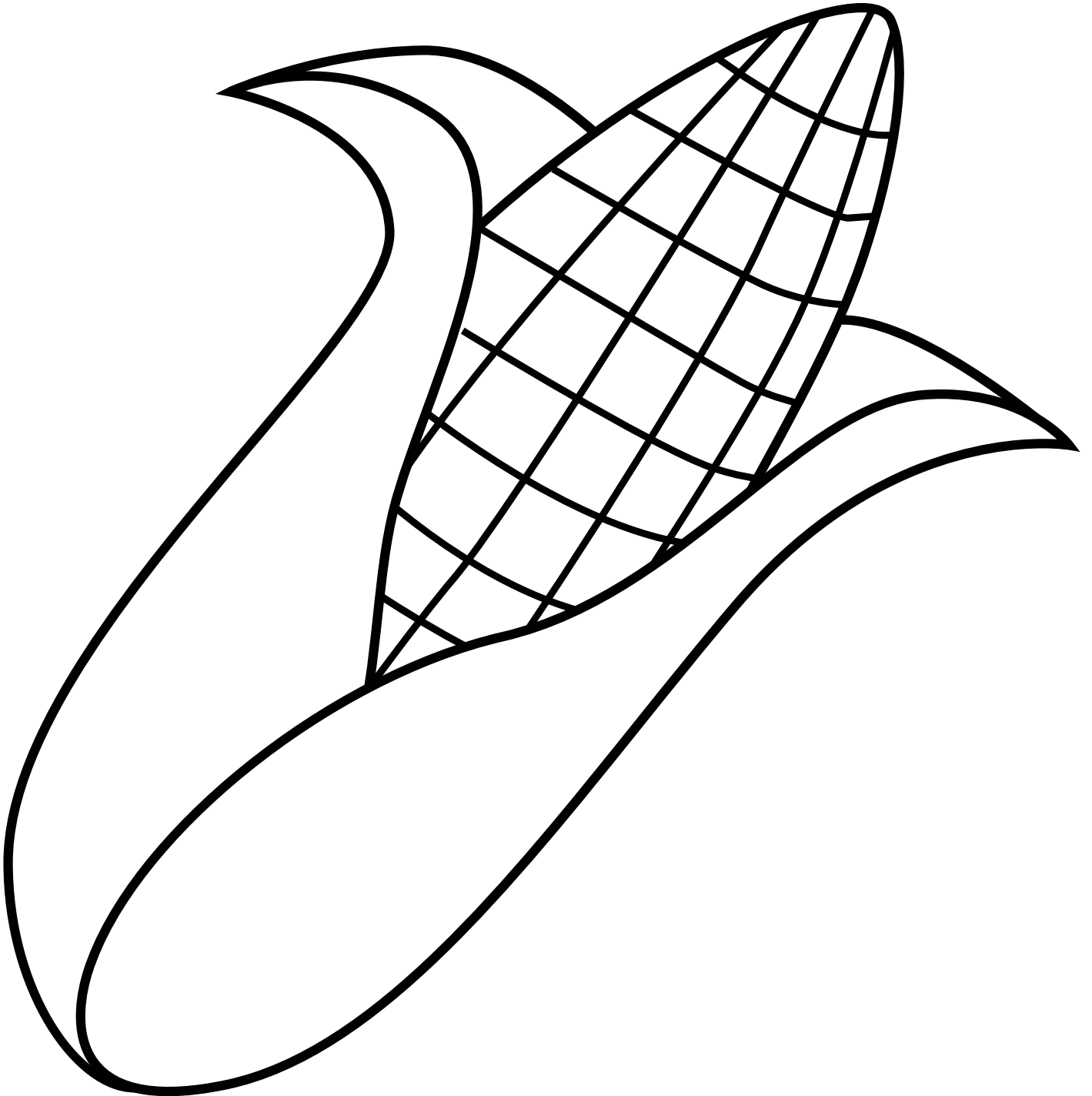
Eggplant



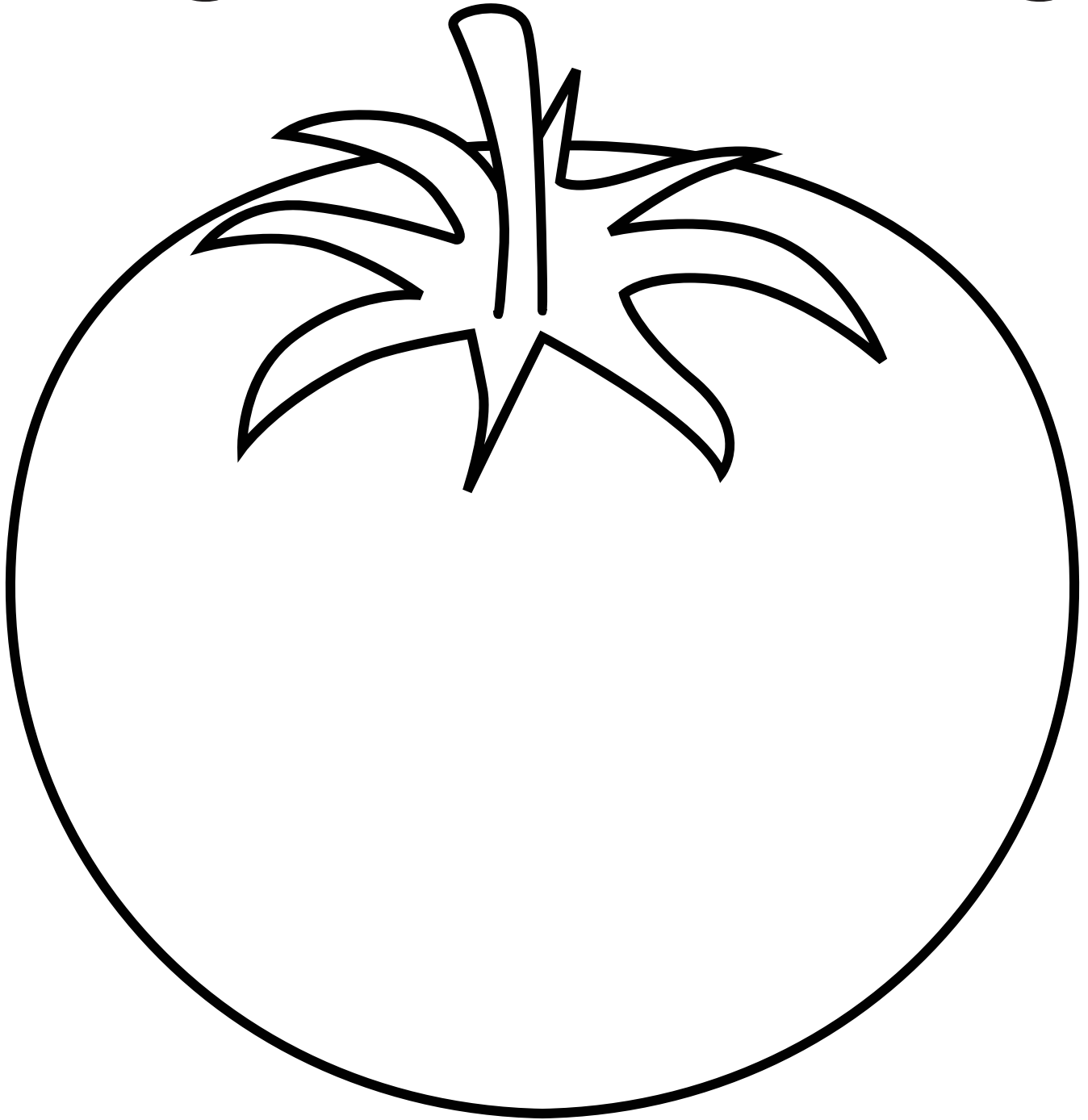
Pepper

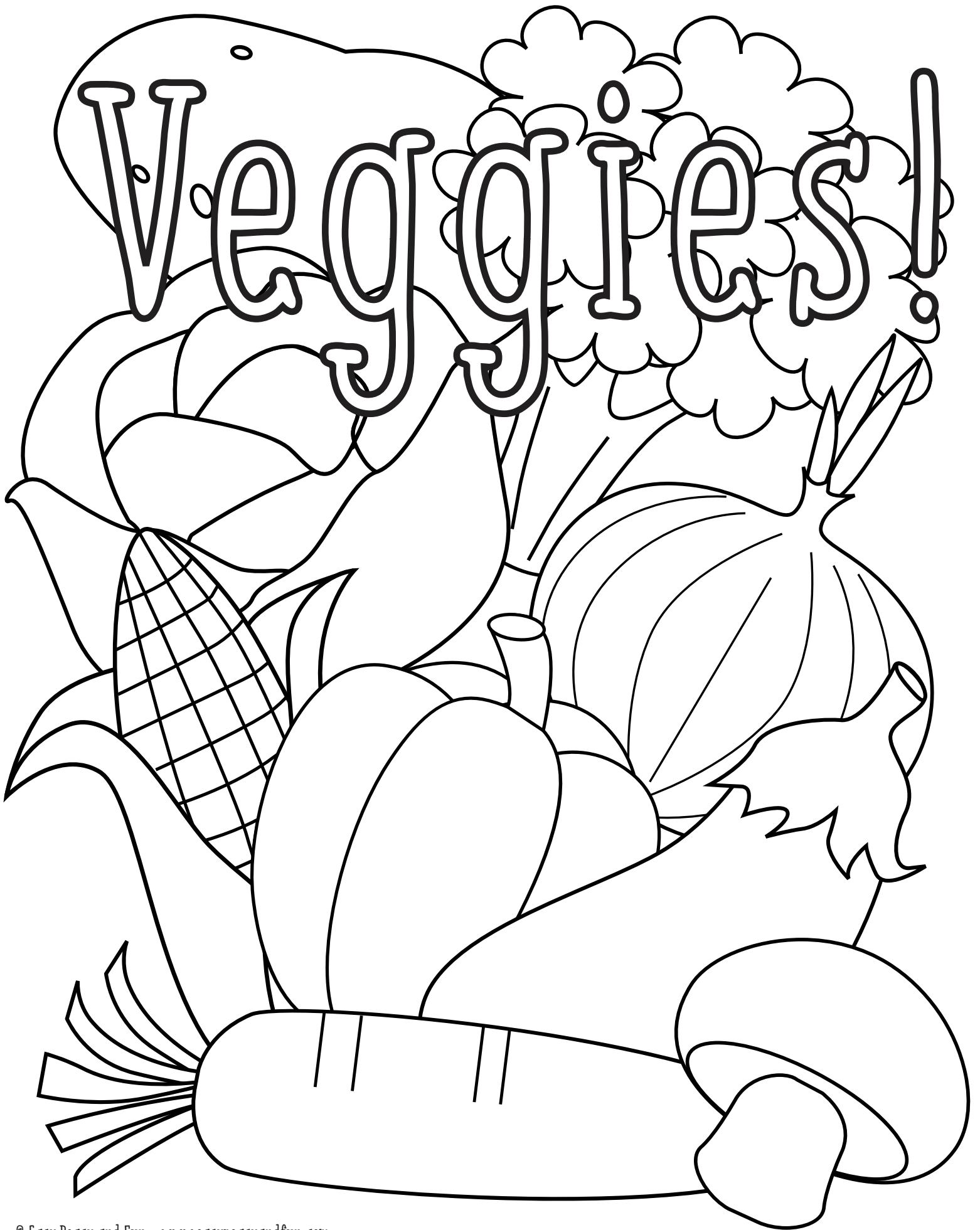


Corn



Tomato





Appendix E: Lesson Plans

Lesson I: Introduction to the Garden

Lesson II: Parts of the Plant

Lesson III: Seeds and Seed Dispersal

Lesson IV: Flowers and Pollinators

Lesson V: Bugs and Insects

Lesson VI: Soil and Compost

Lesson VII: Wondrous Worms

Lesson VIII: Celebration

All lesson plans are adapted from Growing Gardens' Youth Grow Garden Lesson Manual.

Growing Gardens. (2016). *Growing gardens youth grow garden lesson manual* [PDF]. Retrieved April 7, 2019, from <https://www.growing-gardens.org/wp-content/uploads/2013/03/Growing-Gardens-Youth-Grow-Lesson-Plan-Manual-Jan-2016.pdf>

Lessons

Lesson I: Introduction to the Garden

Lesson II: Parts of the Plant

Lesson III: Seeds and Seed Dispersal

Lesson IV: Flowers and Pollinators

Lesson V: Bugs and Insects

Lesson VI: Soil and Compost

Lesson VII: Wondrous Worms

Lesson VIII: Celebration

Lesson I: Introduction to the Garden

Title: Introduction to the Garden

Time Needed: 60-120 Minutes

Age Group: Grades K-5th

Lesson Objectives: Students will be able to...

- Explain Garden Club activities, expectations, and routines.
- Demonstrate basic techniques for planting seeds in the garden.
- Explore the plant life cycle and discover what plants need to grow.
- Compare plant food needs to human food needs.

Vocabulary: Seeds, plant starts, transplants, potting soil, compost, trowel, rake, root, sprout, leaf, flower, fruit, seasons, seasonal plants.

Materials:

- Scavenger Hunt Handouts
- Grow Light (for Winter)
- Potting Soil for indoor planting or compost for outdoor planting
- Seeds appropriate for the season (i.e. lettuce, peas for spring, garlic or cover crops in the fall, and if starting plants indoors, broccoli, collards, etc).
- Popsicle sticks for plant labels
- Seed packets, tape, pens
- Garden journals and pens or pencils (or supplies to make journals)
- Garden tools
- Tasting Supplies

Discussion Questions:

What do plants need to grow?

(Do humans need the same things that plants need to grow? What are they?)

What types of food do you like to eat? What types of foods can we grow in our garden?

What is the first stage in the plant life cycle? (*seeds*)

What plant part makes the seeds?

Why do you think many plants stop growing in the winter?

Lesson Background

Planting with the Seasons:

The types of plants growing in school gardens vary by the season.

Fall: During the early fall, students may be able to explore plants leftover from the summer,



Lesson I: Introduction to the Garden

including tomatoes, basil, peppers, & summer squash. **Winter:** During the winter, students may explore the wildlife in the garden, watch garlic and cover crops sprout, and if a season-extender such as cloche is used, students may be able to grow colder weather plants such as lettuce, mustard greens, broccoli, and cabbage. These seeds will need to be planted in September or October. **Spring:** In the spring, students will be able watch lettuce, kale, chard, and peas sprout in the garden, as well as many types of vegetables, flowers and weeds.

Linking the garden to food, health and nutrition:

Different types of plants require different levels of light for growth and varying temperatures for germination and continued growth. If students have gardens at home, ask the students what they remember planting or growing during the different seasons. Discuss why certain plants may need different amounts of warmth, water, and nutrients to grow. Talk with students about what similarities there are between what people need to grow. Be sure to ask students what types of fruits and vegetables they like to eat and what types they'd like to grow in the school garden.

Exploring the Garden:

On the first day, it is important to set garden rules for safety and follow them throughout the term. As students begin to explore the garden, it is important to remind them to respect the plants and other creatures living in the garden. It is also important for students to understand that they should stay on paths and avoid stepping on garden beds, as this compacts the soil, making it difficult for plants roots to grow, as well as decreases the soil's capacity to hold water.

Planting Seeds:

The first day of class is a great opportunity to talk with students about the basics of planting in the garden. The information below provides an overview of how to plant different types of seeds, as well as how to effectively plant starts. Depending on the age of your students you can adapt the background information to include more or less detail.

Some important things to find out about each vegetable *before planting*:

1. **When** is it optimal to plant the seeds or start outside? (which month)
2. **How deep** do the seeds need to be planted?
3. **How far apart** do you plant the seeds or do you thin them after they germinate?
4. **Where to plant** this vegetable? (Does it need a trellis? Is full sun needed? etc?)
5. **How they might eat this vegetable** do students' families cook with it at home?
6. **When is it ripe** and how do you harvest it?

Direct Seeding: This means planting the seeds directly into the garden soil.

Big seeds: are best for younger children with less developed fine motor skills. Big seeds include: *cucumbers, squash, beans, peas, chard, beets & nasturtiums*:

- Make little holes where you want to plant your seeds. *The holes should be no deeper than your first knuckle.*
- Put 2 seeds in each hole. *About half of the seeds will actually sprout.*

Lesson I: Introduction to the Garden

- Cover with soil (no clumps) and lightly tap down.
- Gently water the soil after planting.
Watering too strongly will wash the seeds or soil away.
- Keep the top of the soil moist.
You will probably need to water once or twice a day.

Little seeds: Better for older children with more developed fine motor skills. Little seeds include: *carrot, spinach, lettuce:*

- Sprinkle the seeds over the soil.
- Cover the seeds with loose soil, 1/4 inch deep.
- Gently water the soil after planting.
- Keep the top soil moist.
- When the plants get their 2nd set of leaves, it's time for **thinning!**

Thinning:

Thinning is the process of removing extra seedlings to ensure each plant has adequate space to develop fully. How much to thin depends on the vegetable and the variety. All seed packets have instructions for how much space is needed between the plants. For fast growing crops such as lettuce or radishes, you can sow thickly, and pull out the small plants as they grow, until you have the recommended distance between plants. You can eat the tender seedlings of crops such as lettuce, beets, chard, spinach, making a delicious early treat for students in the garden. When removing larger plants, use a knife or scissors to cut the stem at ground level. This will thin the plant population effectively and will not damage the root systems of the remaining vegetables, which will occur if the unnecessary plants are pulled-out.

For more information about planting seeds, see Appendix III.

Planting Starts:

Plant starts are young plants that are used for transplanting.

How to Transplant:

- Water your plants well before transplanting.
- Dig a hole in the soil slightly larger than the container the plant is in.
- Carefully remove the entire plant (including the roots and soil) out of the pot.
- Gently place the clump, roots down, into the hole.
- Fill the remaining space in the hole with soil and gently pat down.
- After transplanting, water the soil around the plant, but avoid getting water on the leaves of the plant.

For more information about transplanting starts, see Appendix III.

Grow your own transplants: Using Grow Lights (for Winter Gardening Classes)

There are several options for using grow lights in the classroom. After you build or obtain a grow light find a place in the school that will be easy for you, or another individual at the



Lesson I: Introduction to the Garden

school, to care for throughout the winter months.

Hang the light 6 to 12 inches above the plants, and adjust the light based on plant growth (we use s-hook chains or twine to make it possible to adjust the light height). You could also raise and lower the plants using bricks, etc, if you have a fixed-height light fixture. When working at a school and using grow lights, it is important to make sure the plants are sufficiently watered, and that a timer is used to make sure the light is on for a sufficient amount of time during the day. Work with teachers incorporating taking care of the plants into regular student chores, or try to find a place for the grow lights in an office of an after-school program manager who can help maintain the plant starts if your hours working in the garden at the school are limited. *For more information about grow lights, see Appendix III.*

Making Garden Journals

There are many different ways you can make garden journals. One easy way is to use sheets of 8x11 paper and fold it in half. Use as many sheets as you'd like (5 sheets will make 10 pages, etc). Use a three-hole punch to punch holes in the folded paper and use string to tie the pages together.

Lesson I Procedure

Activity	Summary	Time Needed
Opening: Welcome to Garden Club!	<p>Introductions: Play a Name Game: “My name is __ and I love to...” or “My name is, and my favorite fruit or vegetable is...”, Reference? Take attendance.</p> <p>Go over general class rules.</p>	10-15 minutes
Pre-Evaluation/Check-in Questions	<p>Check in with students about what they know and what they would like to learn. Pass out pre-evaluation (see overview section) and explain to students how to complete it. For younger students, lead them through the evaluation by reading it out loud.</p>	20 minutes
Plant Personification or Thinning game	<p>Lead students in acting out the life of a plant to gain an understanding of what their seeds will go through in the next few weeks (see attached instructions, page xx).</p>	10 minutes
Garden Time: Planting	<p>Discuss with students what plants need to live (sun, water, soil), how plants make food through photosynthesis and get nutrients from the soil and fertilizer. What do people need to grow healthfully? (water, food, shelter, love etc). How are we different/same? Let students know they will be growing their own plants.</p> <p>Teach students how to plant seeds or transplants, either outdoors or under grow lights inside, depending on season, by demonstrating how deep to plant seeds, how many to plant, and how much space plants need to grow. Make sure students label what they plant with the variety, rather than with the students’ name.</p>	20 minutes
Plant Seasonality and Scavenger Hunt		20 minutes



Lesson I Procedure

Activity	Summary	Time Needed
Closing	Clean up, Review lesson by asking “What did you find during the scavenger hunt? What are you most excited for in Garden Club? Why is it important to thin our plants? What season is it now?” Fill out feedback form*. Dismiss class. * Or evaluation method of your choice.	5-10 minutes

Lesson I: Game/Activity Instructions

Plant Personification

Activity Objective: Student will identify the different phases of the plant life cycle.

Description: Students act out the lifecycle of a plant

Time Required: 5-10 minutes

Preparation: Find a space indoors or outdoors where children can spread out

Procedure:

Ask students to spread out into a circle. Tell them that during this activity, they will be acting out the lifecycle of a plant. Ask one student in the group about his or her favorite fruit (remind students that tomatoes could be fruit). Tailor the activity to that particular fruit or vegetable.

- Begin by asking students to curl up into tight ball: You're a **seed!**
- Pretend to be a rain cloud and rain on the little seeds (students) underneath the soil. Tell students to uncurl and kneel. They've sprouted!
- Slowly uncurl feet, staying low to the ground. You've grown **roots**.
- Stick up arms like a little sprout-you've sprouted.
- Open your hands palms up, and wiggle your fingers-you've grown baby **leaves**.
- Wiggle your toes. You grow lots of little roots (rootlets).
- Grow a little taller and spread arms and hands out wider. You've grown bigger leaves. Tell students that their leaves are soaking up the sun, and making food for the plant.
- Stand up (feet together) – Your **stem** has grown taller.
- 'Slurp, slurp'- Your roots drink up water from the ground.
- Spread your fingers wide and surround your face- Your **flowers** are blooming.
- Pretend to be a bee or butterfly, and fly around the room pollinating the little flowers (or ask a student to help you).
- Interlock your fingers and make a circle over your head- you've produced a juicy ripe **fruit** – it is a tomato (or other fruit or vegetable).
- Tell the students that for some reason, in this garden, this one little fruit or vegetable was forgotten by the garden. You sway back and forth, and suddenly...
- 'Splat!'- The tomato (or other vegetable) falls off the stem and breaks on the ground.
- Little bugs and insects help the tomato break down, and suddenly, you are left with a tiny seed.
- Start the activity over, but have the students move through the actions more quickly.

Thinning game (adaptation/extension of Plant Personification):

Play plant personification game, but have students stand bunched together. As they “grow” they will bump into each other. Lead a discussion about how growing too close together makes it difficult for plants to get the sun and nutrients they need. Play again at arm’s distance apart, and discuss how the additional space affects the plants. Another option is to make “sun” and “nutrient” cards and sprinkle them around the students, and have them try and pick the card up during the game, simulating plants competing for resources. Only use this version if you think your group can handle it without being overly pushy or competitive.



Scavenger Hunt Activity (3rd-5th)

SCAVENGER HUNT

Find a **PLANT** in the garden?
Do you know what it is? _____

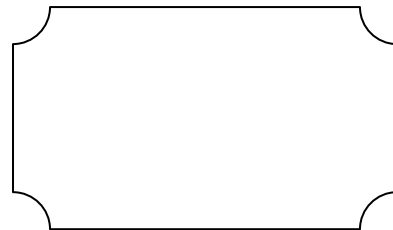
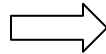
Is it a plant you would like to eat? **YES** **NO** **MAYBE**

List three **COLORS** you see in one of the garden beds/boxes:

Find the **COMPOST BIN**. Name two things in the pile.

COUNT how many steps it takes to walk from the
_____ to the _____

Draw a little map of your path.



Find an **INSECT** or **BUG**. Draw it. 

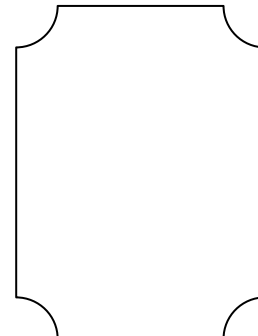


How many legs does it have? _____

What do you think it eats? _____

How does it travel? _____

Find a **FLOWER**. Draw it. 



3. Planting Calendars (For Seasonal Planting Discussion):

SPRING, SUMMER AND FALL PLANTING CHART

Vegetables & Herbs	Direct seed or transplant?	Planting Date (outside)	Space between plants	Seed Depth	Time from Seed to Harvest
Basil	Either	April/after frost	1-2"	1/8"	6 weeks
Beans (snap)	Direct Seed	May - June	4"	1"	8 weeks
Beets	Direct Seed	May – June & July – Aug	4-6"	.5-1"	8 -12 weeks
Broccoli	Either	March - August	18-24"	.5"	14 weeks
Brussels sprouts	Either	May - July	24"	1/4 - 1/2"	12-16 weeks
Cabbage	Either	April - June	18"	1/4"	16 weeks
Carrots	Direct Seed	March- July 15	3"	1/4"	10 weeks
Cauliflower	Either	April - July 15	22"	1/4"	14-19 weeks
Celery	Transplant	March - July	6-8"	1/8"	15-20 weeks
Chard	Either	April - July	10-12"	3/4"	NA
Cilantro	Direct Seed	April - May	1"	1/2"	NA
Collard Greens	Either	June	6"	1/4 - 1/2"	NA
Corn (sweet)	Direct Seed	April - July	12"	1-2"	9-13 weeks
Cucumber (slicing)	Either	May- June	18"	1/4 - 1"	6-8 weeks
Cucumber (pickling)	Either	May- June	18"	1/4 - 1"	6-8 weeks
Dill	Direct Seed	May	9"	1/4 - 1/2"	8 weeks
Eggplant	Transplant	June	18-24"	1/2 -1"	8-11 weeks
Garlic	Direct Seed	Sept - October	4"	1-2"	9-10 months
Kale	Direct Seed	May - July	8-16"	1/2"	NA
Leeks	Direct Seed	March - July	6"	1/4"	10-12 weeks
Lettuce (head)	Either	April - July	10-12"	1/4 -1"	6-8 weeks
Lettuce (leaf)	Either	April - August	6"	1/4 - 1"	6-8 weeks
Onions	Either	March- May	3-4"	1/2"	12-13 weeks
Oregano	Direct Seed	April - May	10-12"	1/4 – 1/2"	NA



Vegetables & Herbs	Direct seed or transplant?	Planting Date (outside)	Space between plants	Seed Depth	Time from Seed to Harvest
Parsley	Either	March - June	6"	1/4 - 1/2"	NA
Peas	Direct Seed	February - May	1-2"	1-1.5"	8-10 weeks
Peppers	Transplant	May	18"	1/4"	14-15 weeks
Radish	Direct Seed	March - September	12-15"	1-4"	3-5 weeks
Spinach	Direct Seed	April & September	1-3"	1/2"	5-7 weeks
Squash (summer)	Either	May - June	6"	1"	7-8 weeks
Squash (winter)	Either	May	6"	1"	12-15 weeks
Tomatoes	Transplant	April/after frost	24-36"	1-4"	8-15 weeks

WINTER PLANTING CHART – COLD HARDY VEGETABLES

PLANT TYPE	WHEN TO SOW (DIRECT-SEED)	WHEN TO HARVEST
Winter Leeks	Mid April–May	October—early April
Fall and Winter Cabbage	Late May—Late July	Late Fall and Winter
Swiss Chard	Mid June—Mid July	Fall and early Winter
Fall Broccoli	Mid June—Late July	Fall and early Winter
Fall Cauliflower	Early July	All Fall
Parsnips	Early July	September—January
Carrots	Early July and September	All Winter and Spring
Rutabaga	Mid-Late July	All Winter and Spring
Beets	Mid-Late July	All Winter
Over-wintering Broccoli	Mid-Late July	Late Winter and Early Spring
Mustard Greens	Mid July-mid Aug (without cloche) <i>Sept-Oct & Feb-March (with cloche)</i>	September—April <i>Nov-June (with cloche)</i>
Spinach	Mid July-Mid August	September—April
Turnips	Mid July—Late August	September—April
Arugula	Mid July- Late September	Winter and Spring
Kale	Mid July—September	All Winter and Spring

Collard Greens	Mid July—September	All Winter and Spring
Endive	Late July-Early Sept (without cloche) <i>Sept-Oct (with cloche)</i>	Sept-Nov (without cloche) <i>Nov-June (with cloche)</i>
Spinach	<i>Late July-Oct, & Feb-March (with cloche)</i>	<i>November—June (with cloche)</i>
Over-wintering Cauliflower	Early August	Spring
Lettuce	Early August (without Cloche) <i>Sept-Oct & Feb-March (with Cloche)</i>	Fall (without cloche) <i>Nov-May (with cloche)</i>
Over-wintering Bulb Onions	Early August	May and June
Spring Cabbage	August—Mid September	All Winter and Spring
Garlic	Early September	July
Shallots	Early September	July
Corn Salad	September	October—April
Fava Beans	Oct 1—November 15	Early June—Early July
Peas	October—Early November	Early Spring

Oregon State Extension Service Gardening Encyclopedia. Monthly Planting Calendars.
<http://extension.oregonstate.edu/gardening/calendar/>



Lesson II: Parts of the Plant

Title: Parts of the Plant

Time Needed: 60-120 Minutes

Age Group: Grades K-5th

Lesson Objectives: Students will be able to...

- List the six parts of a plant.
- Describe the life cycle of a plant.
- Explore the parts of the plants that people eat.

Vocabulary: Roots, stems, leaves, flowers, fruits, seeds, life cycle, photosynthesis, nutrients, plant food/energy

Materials:

- Poster of plant parts
- Mystery Canisters (see attached instructions)
- Garden journals (From Lesson I)
- Franken-Plant Materials: paper, glue, pens/pencils, example
- Leaf rubbing materials: crayons & paper
- Tasting: Plant Parts Veggie Wrap (see recipe)

Discussion Questions:

What is the first stage in this plant's life cycle?
What plant part makes the seeds?
What makes the leaves of this plant special from another plant?
How do the leaves help this plant?
Can we eat plants? If so, which parts?
Why is eating plants good for our bodies and health?
How many plants should we eat? What types?

Lesson Background

Plant Parts/Botany

There are six general parts of a plant: roots, stems, leaves, flowers, fruits and seeds. These six parts happen in succession during the **life cycle** of a plant. At each stage of the life cycle, there are parts of the plant that are most commonly eaten by people (see list attached to lesson with examples of each part of the plant that we eat).

Each stage is essential in the growth of the plant, and when cultivated they are often grown for specific parts and consumption.

The **roots** take up water and nutrients from the soil and act as an anchor for the plant.

Stems are the support system for the parts of the plant above ground; they provide structure

Lesson II: Parts of the Plant

and act as a pathway for nutrients to travel up and down the plant as well as a place for nutrient storage. **Leaves** make food for the plant using **photosynthesis** to convert light from the sun, water from the soil and carbon dioxide from the air into carbohydrates or sugars (food). **Flowers** are the reproductive part of a plant. They usually produce **fruit**, which contain seeds. **Seeds** grow into new plants with water, nutrients from the soil, and sun which warms the soil. A **Vegetable** is considered any parts of the plant we eat that are not considered fruits, flowers or seeds. A fruit is typically considered to be sweet, but peppers, tomatoes & squash are all 'fruit' because they contain the plants seeds.

Nutritional Value of Plants:

It is recommended that people eat 5-9 cups of fruits and vegetables per day for a healthy diet. Fruits and Vegetables include many important nutrients and phyto-chemicals that keep our bodies healthy. Most fruits and vegetables are low in calories. Seeds typically contain a large amount of protein & fat that is necessary for brain and cell health. Encourage students to think about how they can increase the amount of fruits and vegetables they eat everyday. The USDA recommends making $\frac{1}{2}$ you plate at each meal to contain fruits and vegetables.



Lesson II Procedure

Activity	Summary	Time Needed
Opening	Attendance, check-in about previous week, rules reminder, agenda for the class.	5-10 minutes
Introduction to Plant Parts K-2 nd : 3 rd -5 th :	<p>Ask students to give examples of plant parts that we eat. Show plant part poster and teach students to sing plant parts song.</p> <p>Show plant part poster and ask students to list parts of the plants that we eat. In pairs, have students work together to identify different parts of a plant in the garden. In their journal they can draw a plant and label the parts.</p>	10 minutes
Plant Part Identification Activities K-5 th :	<p>Plant Personification: (See Lesson 1: Intro to the Garden). Students will act out the life cycle of a plant, identifying each plant part.</p> <p>Mystery Canisters: Using the sense of touch and smell, students identify different plant parts in mystery canisters (see attached instructions).</p>	10-15 minutes
Garden Time: K-2 nd : Leaf Rubbings & Plant Part Identification 3 rd -5 th : Planting	<p>Leaf Rubbings: Ask students to collect different leaves from the garden? What are the differences? What are the similarities? Why are leaves important to plants? Are the leaves edible to humans? Have students select their favorite leaf and do a leaf rubbing to take home.</p> <p>Plant Part Identification: (see attached instructions).</p> <p>Check on seeds or transplants planted the week before, and plant seeds relevant to season.</p>	20-30 minutes
Art Activity: Franken-plants	Students collect garden materials or use paper to create their own plant creatures incorporating the six different plant parts.	15 minutes + 5 minutes to clean up

Lesson II Procedure

Activity	Summary	Time Needed
Food and Nutrition	Discuss why eating fruits & vegetables are important to a healthy diet. Using a collard or chard leaf, make a veggie wrap containing any combination of plant parts (see attached recipe).	15 minutes
Closing	Clean up, review lesson by asking “What are the six parts of a plant?” What is a stem that we eat...?” What did we plant last week?” Fill out feedback form*. Dismiss class. * Or evaluation method of your choice.	5-10 minutes



Lesson II: Game/Activity Instructions

Plant Parts Song (K-2nd grade)

Singing “Roots, Stems, Leaves, Flowers, Fruits and Seeds,” make hand and body movements. ***No specific tune for this song, enjoy making one of your own. ***

1. Hands on the ground for roots;
2. Hands flat against legs for stems;
3. Hands opening up towards the sky for leaves;
4. Spread your hands wide around face for flowers;
5. Circle your arms like you are holding a ball for fruits;
6. Plop down to the ground to resemble a big, bursting fruit falling to the ground to release its seeds.

Plant Personification (K-2nd grade)

See lesson plan activities for Lesson 1: Introduction to the Garden.

Mystery Canisters Activity (K-2nd grade)

Discover the parts of a plant hidden within *Mystery Containers*.

Goal: To introduce students to the parts of a plant that we eat.

Objective: To use the information learned about plant parts to identify them by touch.

Time: 15 minutes

Preparation: Show students a plant parts diagram; have them brainstorm different parts of plants we eat.

Materials: Several cardboard boxes (or paper bags), various plant parts from different plants.

Procedure: Ask the students to name the six parts of a plant. Review each one and ask them to say what each part does for the plant. Go out and collect several plant parts. Make six or more “blind, touch and feel” boxes by cutting a hand holes in one side of a box (if time allows, cut the foot off a sock and staple sock around hole, this way students put their hands into the sock and cannot see into the box). Place a different plant part in each box and number the boxes. Have the students number a sheet of paper, go to each plant box and guess each part by feeling only, and write their guesses on their papers by the corresponding box numbers (remind students to stay quiet to not give it away!). After the whole group has completed guessing, unveil each part and review its purpose for the plant.

(Adapted from: Junior Master Gardener Teacher/Leader Guide Level 1, pg 9)

Plant Part Identification

Goal: To introduce students to the parts of a plant that we eat.

Objective: To use the information learned about plant parts to identify them by touch.

Time: 25 minutes

Preparation: Write out prompts for student reference. Gather seed packets or pictures of flowering/fruited plants that are in the garden. Review plant parts diagram and brainstorm different parts of plants we eat as a whole group.

Materials: Garden club journals, pencils/crayons, seed packets or pictures of flowering/fruited plants from the garden.

Procedure: In pairs, students will work together to identify different parts of a plant in the garden. They should record their findings in their journal by drawing the different parts and labeling them. For plant parts that are unknown, the students should brainstorm what that would look like, then reference seed packets or other materials.

If you have extra time, have students discuss with their partner the following prompts.

What is the first stage in this plant's life cycle?

What plant part makes the seeds?

What makes the leaves of this plant special from another plant?

How do the leaves help this plant?

Can we eat this plant? If so, what part of this plant do we eat?

Leaf Rubbings

Collect leaves from the garden. Place leaves between two sheets of paper. With a crayon, rub the top page of the paper so that the shape of the leaf comes through on the page.

Franken-plants

Goal: To review the parts of a plant in a creative way.

Objective: To use the information learned about plant parts to create a plant of their own.

Time: 15-20 minutes

Preparation: Prepare art materials that will be used. Create a sample.

Materials: construction paper per student, glue, tape, markers/crayons, plant parts from the garden or miscellaneous art materials, such as various types of paper, pipe cleaners, stickers, glitter, magazine bits & string.

Procedure: Students collect garden materials or use paper to create their own plant creatures. Challenge them to incorporate all six different plant parts. If there's time, have them create an environment for their plant, and purposes for their plant parts.

Edible Plant Parts

Use this chart to help students identify different plants they eat, and which part of the plant they are.

FOODS WE EAT THAT ARE ROOTS	FOODS WE EAT THAT ARE STEMS	FOODS WE EAT THAT ARE LEAVES
Beet	Asparagus	Brussels sprouts
Carrot	Bamboo shoots	Cabbage
Onion	Bok Choy	Chard
Parsnip	Broccoli	Collards
Potato	Celery	Endive
Radish	Kohlrabi	Kale
Rutabaga	Rhubarb	Lettuce
Sweet potato		Mustard greens
Turnip		Parsley
Yam		Spinach
		Turnip greens
		Watercress
FOODS WE EAT THAT ARE FRUIT (anything that contains seeds)	FOODS WE EAT THAT ARE FLOWERS	FOODS WE EAT THAT ARE SEEDS
Apple	Artichoke	Almonds
Apricot	Borage	Black beans
Avocado	Broccoli	Butter beans
Banana	Calendula	Cocoa
Berries	Cauliflower	Dry split peas
Cucumber	Nasturtiums	Wheat (flour, pasta)
Date	Pansies	Kidney beans
Eggplant		Lima beans
Grapefruit		Peas
Grapes		Oats (oatmeal)
Pear		Pinto beans
Pepper		Popcorn
Pineapple		Pumpkin seeds
Pumpkin		Rice
Squash		
Tomato		

Recipe: Plant Parts Veggie Wrap

Ingredients:

- Root (carrot, beet, radish, etc.)
- Stem (celery, green onion, leeks, etc.)
- Leaf (lettuce, kale, collards, sorrel –large enough to wrap veggies in)
- Flower (broccoli, cauliflower, edible flower)
- Fruit (tomato, peppers, apples, etc.)
- Seed (sunflower seeds, beans, or bean dip (such as hummus) etc.)

Supplies:

Cutting board, knife, large plate, small serving bowl, plates for all students.

Directions:

1. Make sure to use safe food handling procedures. **Rinse** all vegetables really well.
2. Get a plate large enough to hold all of the veggie slices. After you are done cutting one vegetable, place them together on the plate while leaving space for the others so it looks similar to several slices of pie.
3. Slice **root** veggies in thin strips.
4. Cut **stem** in long thin strips – if using an onion, cut thin enough so flavor won't be too strong.
5. Cut off any long stem from **leaf** – this will depend on the leaf – some may not have a long stem, like lettuce.
6. Chop **flower** in small pieces – they are very fibrous and can be hard to chew if too large.
7. Cut **fruit** into long strips, circles, or small pieces depending on the fruit.
8. Pour **seeds** into a separate bowl. If using a bean spread, place in a separate bowl.
9. Make a demo plant part wrap - take the large leaf, lay it flat on a plate with the curled sides facing up. Add a few items from each category on top of the leaf - make sure it isn't too full so that you can wrap the leaf around it. Roll it up and you have a plant part wrap!
10. After all students have washed their hands, invite each student to make their own wrap.
11. Sit down and eat the wraps together. Discuss how they taste and how students could make this at home.

Lesson III: Seeds and Seed Dispersal

Title: Seeds and Seed Dispersal

Time Needed: 60-120 minutes

Age Group: Grades K-5th

Lesson Objectives

Students will be able to:

- Explain that seeds are produced in a variety of sizes, shapes, and colors.
- Describe the germination process and the parts of a seed.
- Describe the basics of seed production (as part of the plant life cycle) and seed dispersal.

Vocabulary: Seeds, seed coat, stored food/nutrients, germination, seed dispersal

Materials

- Plant life cycle poster & seed poster
- Presoaked (overnight) bean seeds (1 per student)
- A variety of seeds
- Examples of fruits that contain seeds: i.e. tomato, squash, peppers, and flowers.
- Seed Matching Game (see attached instructions)
- Materials for paper-making or seed papers.

Discussion Questions:

What do seeds need to grow?

Why do seeds have different characteristics (shapes, sizes, etc)?

Why are seeds important for people and wildlife?

Lesson Background

Seeds: Seeds are the basis of life. Seeds are contained within the fruits of the plant. Seeds contain a new plant, as well as **stored food** or **nutrients** that new the plant needs to grow. Seeds need specific temperatures and water to **germinate** or break open the **seed coat** (the hard outside coating of seeds) and sprout. Once a seed sprouts, it extends roots into the soil, emerges through the soil, and produces a small plant called a seedling. Remind students of plant parts lesson and plant life cycle. Where did the seed come from? How does the plant grow from seeds?

Seed dispersal and wildlife: Seeds come in many different shapes and sizes, and these different shapes, sizes, and other characteristics help the seed travel to new places to grow. For example, an acorn from a tree falls to the ground around that tree, but a squirrel could pick it up and carry it to a new location. A dandelion seed is very light, and has a little

Lesson III: Seeds and Seed Dispersal

“parachute” that helps it move long distances in the wind. What are other ways seeds can travel?

Nutritional value of seeds: Can you think of a seed you eat? (Examples include: Garbanzo beans in hummus, almonds, pumpkin seeds, sunflower seeds, bread is made from seeds (grains are seeds of grasses). Seeds have a lot of energy – the energy is needed for the seed to grow and when we eat those seeds, we get a lot of energy and protein from them.

Lesson III Procedure

Activity	Summary	Time Needed
Opening	Attendance, check-in about previous week, quick rules reminder, agenda for the afternoon.	10 Minutes
Seed Dissection Activity	Show seed poster and discuss germination with students before beginning seed dissection. Provide students with seeds (beans work best) that have soaked overnight to dissect and discuss why seeds are important. Bring some un-soaked seeds to show the difference between the soaked and un-soaked seeds.	15 Minutes
Seed Exploration and Seed Saving	If available, go to the garden and have students look for different types of seeds. Bring an example of a familiar plant that has gone to seed. Introduce students to seeds by cutting open a pepper or squash. How many seeds are inside? How many plants could be grown from those seeds? What are students' favorite seeds to eat?	15 Minutes
Seed Matching Game	Play Seed Matching game (see attached instructions).	15 Minutes
Paper-making or Seed papers (time depending)	<p>Students will either create homemade paper using flowers and seeds or create seed strips that can be planted.</p> <ol style="list-style-type: none"> 1. For paper, have students collect materials from the garden, and provide students with small seeds that can be easily incorporated on to paper (carrots, lettuce, etc). (See attached instructions). 2. Use white glue and glue seeds to paper (teaching students about the appropriate spacing for different types of seeds). 	<p>1 hour for paper making, plus drying time.</p> <p>20 Minutes for Seed Papers</p>
<p>Garden Time: Planting Seeds</p> <p>K-5th.</p> <p>3rd-5th</p>	<p>Check on plants planted in previous weeks. Plant more seeds or starts relevant to the season.</p> <p>Before planting have students find/read information on the seed packet. How many days after planting will they sprout? How deep should the seeds be planted? What temperature</p>	15-20 Minutes

Lesson III Procedure

Activity	Summary	Time Needed
	<p>does the plant need to grow? How much space should there be between the seeds? What will it look and/or taste like after it is harvested? Have students' journal their findings and use the "Watch Your Seeds Grow" worksheet throughout the following weeks.</p>	
<p>Seed Dispersal Activity</p>	<p>Talk to students about how seeds are transported around in the world (i.e., have they ever had seeds stick to their pant legs or pet? Have they ever noticed how dandelion seeds are carried in the wind?). Bring some examples if possible or explore in the garden. Then ask students to draw their own imaginary seed with a way for it to be carried to another place in the world, encourage them to be inventive. Ask the students to share their seed designs with other students.</p>	<p>15-20 Minutes</p>
<p>Food and Nutrition</p>	<p>"What kinds of seeds are foods that we eat (Pumpkin seeds, corn seeds, bean seeds, pea seeds, sesame seeds, sunflower seeds, grain, nuts, coconut)? Why are seeds healthy for people to eat? Prepare and serve tasting (hopefully including some seeds, think seasonally).</p>	<p>10-15 Minutes</p>
<p>Closing</p>	<p>Clean up, review lesson & ask discussion question: What do seeds need to germinate and grow?" Fill out feedback form*. Dismiss class. * Or evaluation method of your choice.</p>	<p>5-10 Minutes</p>

Lesson III: Game/Activity Instructions

Seed Dissection Activity

Grades: K-5th

Objectives: Learn about the seed germination process and, using scientific names, identify the parts of a seed.

Materials:

- Soaked bean seeds
- Diagram of a seed and poster of seed growth cycle (including labeled seed parts, such as seed coat, cotyledon, embryo, endosperm).
- Plates or paper towels for each student

Preparation: Soak bean seeds overnight, make sure there is one seed per student.

Activity Instructions:

Ask students what they know about seeds: What is in a seed? What causes a seed to grow? Show them a variety of seeds. What seeds do they eat? Why do seeds grow in a variety of different shapes?

Hand out softened beans and have students dissect looking for all the parts.

Questions:

What would happen in a place where it doesn't rain? What if the seed did not have any food included in the seed coat? Why are seeds important?

Seed Papers and Paper-Making

Grades: K-5th

Objectives: To understand the process of decomposition (of paper, or other carbon materials) and seed spacing.

Materials:

For seed papers:

Strips of construction paper or white paper
Different types of seeds (large and small)
Washable, non-toxic markers for labeling
White, non-toxic glue

For paper-making:

Paper-making screens (made from old, small picture frames with wire screen stapled to each side of the frame)

Towels

Recycled paper that has soaked overnight

Blenders

Water

Washcloth or Sponges

Plastic tubs for draining water from screens and holding blended paper pulp

Small seeds, flower petals, and leaves from the garden

Preparation:

For seed papers: Create sample seed paper strips to show students different spacing required by different types of plants. You may also want to do a quick activity with students on square foot gardening so they can better visualize the amount of space required by different types of fruits and vegetables.

For paper-making: You may want to soak sheets of recycled office paper, construction paper, etc, overnight to speed up the process. You may also want to blend some of the soaked paper with additional water, in advance, to ease the process/reduce the amount of time it takes to produce the paper.

Before class, blend the soaked paper with water to create the paper pulp. Do this enough times to fill the plastic tub where students will dip the frames with the screens. Add water to the pulp to make it easy to dip the frame into the tub.

Lay out towels or newspapers where students will be able to let their paper dry. Provide students with scrap paper and pens to label their paper creations.

Activity Instructions:**For Seed Papers**

1. Explain the activity to students. Ask students what they think would happen to paper if they buried it under soil. What do seeds need to grow? How much spacing do plants need to grow?
2. Distribute strips of paper and glue to students at tables. Show students the sample seed papers, with spacing for different types of vegetables. Ask students to look at the back of seed packets to see how seed packets show the needed spacing for different plants.
3. Provide students the different types of seeds in cups or on plates, and ask them to glue the seeds to the paper using the correct spacing.
4. Find a place in the classroom for the seed papers to dry. Students may put their names on the papers.
5. The following week, have students plant their seed papers in the garden. You may also want to send the papers home for them to plant with their families.

For Paper Making:

1. Ask students to collect materials from the garden that they would like to include in their paper. Remind them that the materials need to be able to lie flat, and that there will only be space for a few items (enough to cover your palm).
2. Bring students inside and demonstrate how to make the paper. Show the students the soaked recycled paper, place it in the blender with enough water to cover the paper, and blend. Pour the pulp into a plastic container large enough to dip the frame into and add water.
3. Dip the frame into the pulp and water mixture and lift up. The pulp should cover the screen. Gently press the water out of the pulp, through the screen, using your hand, a sponge, or a wash cloth. Continue pressing until as much water as possible has been removed from the frame.
4. Turn the frame over on to the towel and tap the back of the frame to release the paper. Have students add the plant materials by pressing the materials into the slightly wet paper pulp.
5. Let the paper dry (label with a piece of paper including the students' name). Depending on the thickness of the paper, the paper may take up to a week to completely dry.
6. Students may want to give the paper as a gift to a family member, or, if the student included seeds, students can also plant their paper in the garden!

Seed Matching Game

Grades: K-5th

Objectives: Students will learn to identify different types of seeds.

Materials: 8 seed packets, ideally very distinct seeds i.e. corn, pumpkin, broccoli, sunflower, peas, carrots, tomatoes, pepper.

Activity Instructions: Empty seed packets, and put each seed type in a separate plastic baggie, or a small, clear, plastic box. Cut the seed packets in half and past the front half of each packet to a large piece of paper. Copy this page and laminate if possible. Make as many copies as you need, and make sure you have enough seeds for each set. Have the students divide into pairs, and pass one page to each pair of students, along with containers or baggies of each seed. Ask the pairs of students to match the seeds to their packet.

Watch your Seeds Grow

Use this chart to draw one of your seedlings as it grows. Each week, draw a picture of your plant and write down how tall it is.

Week 1 height _____ <i>Name of seed:</i>	Week 2 height _____ 	Week 3 height _____
Week 4 height _____ 	Week 5 height _____ 	Week 6 height _____

Take Note!

How many days after planting did the first seedling poke through the soil?

How many days did it take for all the seedlings to appear?

Other observations:

Lesson IV: Flowers and Pollinators

Title: Flowers and Pollinators

Time Needed: 60-120 minutes

Age/Grade: K-5th

Lesson Objective:

Students will be able to:

- Describe the basic anatomy of a flower.
- Define and be able to give examples of pollinators.
- Describe how a plant is pollinated.
- Describe what occurs after pollination.

Vocabulary: Pollen, pollinator, pollination, stigma, style, filament, petal, stamen, anther, pistil, sepal, ovule, nectar.

Materials:

- Enough flowers for each student to dissect one (look around gardens or you may have to purchase cheap flowers during the winter)
- Flower anatomy diagrams
- Pictures of different pollinators (see resources list for ideas)
- Pollination Game Materials (see attached instructions)
- Tasting: An edible flower (i.e. broccoli, cauliflower, squash blossoms, nasturtium)

Discussion Questions:

Who can name a type of a flower?

How do flowers get their names (dandelion)?

Why are flowers such bright colors?

What is a pollinator? What are some examples of pollinators?

Do people eat flowers? Are all flowers edible? (no! but some are)

Lesson Background

Flowers are the reproductive parts of a plant. Flowers are designed to make fruits and create seeds that grow into new plants. Color, shape and scent of the flower attract various insects and birds that travel from flower to flower picking up and leaving pollen behind. The pollen travels deep into the flower and meets the ovary. Once pollination has occurred, the petals fall away and seeds develop in the ovary, with the ovary itself becoming fruit.

Flowers are composed of several parts. A **pistil** is the group of female reproductive parts of the flower which includes the stigma, style and ovary. The **stigma** receives the pollen from

Lesson IV: Flowers and Pollinators

insects and other pollinators. The **style** is the stem that holds up the stigma. The **ovary** produces the seeds used to grow new plants. Fruit is the fertilized ovary of a plant. **Stamens** are the group of male reproductive parts of the flower that include the anther and filament. An **anther** creates the pollen. A **filament** is the stem/stalk that holds up the anther. **Sepals** are the leaf-like parts under the petals that protect the flower bud while the flower is developing. They are usually green and able to produce food from the sun (photosynthesize). **Petals** are the largest part of the flower: beautiful, colorful and sweet-smelling to attract pollinators.

Pollination occurs when male pollen lands on the female stigma, travels down the style, and fertilizes the female ovary. The fertilized egg develops into seeds and nuts that fall into the soil and then grow into new plants. Flowers can't move so they have evolved to find ways to make sure pollination takes place such as: bright colors, aromatic nectar, shape of flower designed for certain type of pollinators and/or lightweight flowers for wind pollination.

A pollinator is anything that helps spread flower pollen. There are all kinds of pollinators: birds, bats, bees, bugs and even wind. Pollen is produced by the male reproductive part of the flower, and is composed of fine powder-like grains that contain male sex cells. Pollinators are out collecting pollen to bring back to the nest and to drink nectar. They go from flower to flower to get food (nectar). They get pollen on their legs or beaks and then when they go to another flower to eat, they drop off pollen from other flowers.

Plants reflect the type of pollinator it's trying to attract through the size, the color, the scent, amount of nectar, composition of nectar, etc. For example, birds visit red flowers with long narrow tubes and lots of nectar, but are not as strongly attracted to wide flowers with little nectar and copious pollen, which are more attractive to beetles.

For example:

Beetles are attracted to white or dull-colored flowers with a fruity or spicy fragrance.

Honey bees are attracted to showy, bright petals, often blue or yellow.

Mosquitoes: Small flower, often white or green.

Butterflies: Red, orange, blue, or yellow flowers.

Bats: Large flower with fruity fragrance and lots of nectar.

Hummingbirds: Red flower, little or no fragrance.

Moths: White or yellow flowers with heavy fragrance.

Wind helps pollinate small, odorless, colorless flowers (i.e.: grasses, corn).

Lesson IV Procedure

Activity	Summary	Time Needed
Opening	Attendance, check-in about previous week, rules reminder, agenda for the class.	5-10 minutes
Flower Anatomy and Pollination	Using flower anatomy poster, describe role of each flower part. Discuss how plants are pollinated. One good place to start is with: "Every fruit that you enjoy was once a flower—once that flower is pollinated, it becomes fruit."	10 minutes
Garden Time: Flower Hunt	Go on a flower hunt (in the garden weather permitting or using picture books), and collect and create new names for flowers based on flower characteristics. Ask students to consider what type of pollinator would be attracted to each flower. Have students share one flower name and information about the flower with the rest of the class. Check on plants planted in previous weeks and observe their growth.	15 minutes
Flower Dissection	Students work in pairs dissecting flowers. Ask students to examine their flowers and look for the different flower parts, and lead them through the dissection (see attached instructions).	15-20 minutes
Pollination Game	See attached instructions.	15-20 minutes
Food and Nutrition	Harvest snack from garden or have students do a "Flower Taste Test" with edible flowers (like nasturtium, calendula, or borage) and broccoli and cauliflower.	10-15 minutes
Closing	Clean up, review lesson by splitting students into pairs. In pairs, have students share what happens after a flower is pollinated (it will become a seed/fruit). Fill out feedback form*. Dismiss class. * Or evaluation method of your choice.	5-10 min

Lesson IV: Game/Activity Instructions

Pollination Game

Grades: K-5th

Objectives: To explore how the pollination process leads to seed and fruit production and how different types of plants have different types of pollen.

Materials:

- Flower headbands (two of each type of flower used). Make flower headbands using different photos of flowers and gluing them on strips of paper long enough to wrap around children's heads. You can add Velcro after the paper is laminated.
- Bee or other pollinator headbands (see information above).
- Envelopes with different pollen types (different color squares of paper) for each flower.

Game Instructions:

1. Divide the students into two teams.
2. For each team, assign one student to be a flower and one student to be a bee (or other pollinator). It is helpful to have headbands or armbands to signify which students are bees and flowers.
3. Tell the remaining students that they are the flower's "pollen". Provide students pieces of paper to signify the pollen, and tell them to hide their pollen in a pocket.
4. Ask teams to stand on different sides of a field.
5. Tell students that when you say go, the bee from each team needs to run and tag the "pollen" students. When a "pollen" gets tagged, they reveal which flower they belong to, by showing the "pollen" in their pocket. If they are from the opposite team, the bee brings them back to their home flower.
6. When that pollen touches their home flower, the pollen "pollinates" that flower and becomes a seed.
7. Ask students that are pollinated to curl up like a little seed to help the bee pick out students that have not helped pollinate the flowers.
8. When the bee has gathered all the pollen from one team, the game is over.
9. At the end of the game, ask students how the game relates to pollination. How does pollination help us grow fruits and vegetables?

Flower Dissection

Grades: K-5th

Objectives: To explore how the pollination process leads to seed and fruit production and how different types of plants have different types of pollen.

Materials: Flowers, plates or paper towels

Process:

Lead students through the dissection step by step:

1. First count the petals as you pull them off-how many petals do you have?
2. Next count the stamen and anthers, how many do you have?
Does anyone have anything yellow on their hands? What do you think that is?
3. Now we have the pistil, let's pull it open, does it feel sticky inside?
Why do you think it is sticky inside?
Where can I find pollen in this flower?
4. How many anthers are there?
5. What is the sticky part called (stigma)?
Why is it sticky? (to collect pollen)
6. What will eventually happen to the flower? (it will become a seed/fruit)
Do all flowers look the same?
Do different types of flowers have the same parts?



Lesson V: Bugs and Insects

Title: Bugs and Insects

Time Needed: 60-120 minutes

Age/Grade: K-5th

Lesson Objectives:

Students will be able to:

- Describe the basic anatomy of an insect.
- Identify some beneficial and pest insects in the garden.

Vocabulary: Exoskeleton, anatomy, antennae, compound eyes, thorax, abdomen, wings, predators, pollinators.

Materials:

- Anatomy of an Insect Poster
- 15 bug collecting jars (preferably plastic)
- Ladybug/Aphid Tag costumes (see attached instructions)
- Tasting supplies for edible insects
- Toothpicks.

Discussion Questions:

What is an insect?

Why are insects important for the garden?

Where do different insects like to live in the garden? Why?

What do different insects eat?

Lesson Background

Insects are part of an animal group known as '*arthropods*'. Arthropods have a hard protective exterior case known as an 'exoskeleton'. Arthropods contain a host of well-known multi-legged creatures including arachnids (spiders), millipedes and crustaceans (ocean lobsters and crabs).

For the purpose of the lesson, we will teach about arthropods that have six main features: two antennae, compound eyes, six legs, and two pairs of wings, a thorax and an abdomen. Not all insects have wings; it depends on the species (for example ants are insects but some have wings and others do not).

Biology The exoskeleton makes up the entire surface of the insect's body put together by separate plates meeting the joints of the body and legs. Arthropods do have muscles within the exoskeleton, but the muscles attach to the exoskeleton itself (as opposed to muscles

Lesson V: Bugs and Insects

attaching to ligaments and tendons, which attach themselves to bones in a human body.) Movement is accomplished through these moving muscles, which in turn, move the plated exoskeleton parts. Exoskeletons are primarily made of a substance known as 'chitin' which is comparable to our real-world plastic. This substance is made to be self-moistening to prevent the surface of the insect from drying out. Insects have other unique physical features. The legs are all attached to the thorax, and all organs are located in their abdomen. The "brain" is actually found throughout the body in the form of nerve bundles that run from the head down through to the abdomen.

Ecology Insects play many roles in the garden. Insects can be predators, pollinators, and pests (defined by humans because these insects eat our food crops). Common predators include: ladybugs, praying mantis, assassin bugs and green lacewings. Common pollinators include bees, flies, butterflies and ants. Common pests include aphids, Colorado potato beetles, and cabbage worms. In this lesson we play the game "Ladybug/aphid tag" to introduce students to the roles insects can play in the garden and the importance of a balanced mix of critters.

Lesson V Procedure

Activity	Summary	Time Needed
Opening	Attendance, check-in about previous week, rules reminder, agenda for the class.	5-10 minutes
Insect Anatomy/Ecology K-2 nd . 3 rd -5 th .	Show students insect anatomy poster, and discuss the parts of an insect. Sing the insect song (see attached instructions). Ask students to describe insects they have seen at school or in their gardens at home - What did they look or sound like? What color are they? Where did they find (on a leaf, etc), How did they move (fly, crawl, etc).	10 minutes
Garden Time: Insect Hunt K-5 th	Search for different bugs and insects in the garden. Do they have three body sections? Antennae and wings? What kinds of mouth parts do they have? What do they eat? How do they move? Have students share their discoveries with other students in the class. Check on plants planted in previous weeks and observe growth. Plant more seeds relevant to season.	20 minutes
Ladybug and Aphid Tag K-5 th	Play ladybug and aphid tag and discuss the role of pests and beneficial insects in the garden.	20 minutes
Food and Nutrition	Use toothpicks and different fruits and veggies to create edible insects. Encourage students to make their insects as anatomically correct as possible. It helps to make an example insect. One version that works well is using a raisin for the head, a grape for the thorax, a piece of kiwi for the abdomen, and kale for the wings. Make sure materials are prepped before class begins.	15 minutes
Closing	Clean up. For a review activity, have students share their insects and point out the various parts of the insect anatomy. Fill out feedback form*. Dismiss class. * Or evaluation method of your choice.	5-10 min

Lesson V: Game/Activity Instructions

Ladybug and Aphid Tag

Level: K-5th

Goal: Students will understand the importance of balance in the garden.

Background: Ladybugs are considered 'good' bugs because they eat pests called aphids. Aphids are small insects that suck juices out of common garden plants like roses and brassicas (broccoli, cauliflower, kale etc). In a healthy garden there are a variety of bugs and insects who will create a healthy balance.

Materials: Optional costumes are red, tan and green bandanas (one for each student participating) to distinguish ladybug, aphid and plant players.

How to play:

The game works best if there are at least six students.

Choose a few children to be ladybugs and a few children to be aphids. All the rest of the children are plants. It is helpful to tie a red bandana around the ladybug's heads or arms and green or brown bandannas around the aphid's heads/arms to identify the different players.

Next determine the boundaries for the game so the children know where they can and where they cannot play – make sure they stay out of the streets and away from anything that may be unsafe. Also explain the safety rules – how to tag without hurting or pushing each other.

In the game, the ladybugs tag the aphids and the aphids tag the plants.

Once tagged, the player must freeze and not participate in running around.

You can play this game several times and select more or less ladybugs versus aphids versus plants. After each game, reflect with the children about what it might be like if there were no ladybugs in the game (all the plants would freeze) or if there were no aphids (there would be nothing for the ladybugs to eat).

Insect Song:

****To the tune of 'Old MacDonald Had a Farm:'**

I am in insect in this life and this is what I look like: (*There was a farmer who had a dog and BINGO was his name-o...*)

Two antennae (make antennae with your hands/fingers in your head) (*B-I-N-G-O...*)
Compound eyes (make large round eyes with your hands above your eyes) (*B-I-N-G-O...*)
1-2-3-4-5-6 legs (count 1-2-3 on one side of your body, 4-5-6 on the other) (*B-I-N-G-O...*)
Two pair of wings so I can fly (make flapping motion with your arms) (*AND BINGO...*)
A thorax (touch your chest) (*WAS HIS...*)
And an abdomen (shake your hips and abdomen) (*NAME-O*)

Recipe: Edible Insects

Supplies needed: fruits and veggies, toothpicks, plates for each student

Use toothpicks and different fruits and veggies to create edible insects. Encourage students to make their insects as anatomically correct as possible. It helps to make an example insect. One version that works well is using a raisin for the head, a grape for the thorax, a piece of kiwi for the abdomen, and kale for the wings. Make sure materials are prepped before class begins.

Lesson VI: Soil and Compost

Title: Soil and Compost

Time Needed: 60-120 Minutes

Age/Grade: K-5th

Lesson Objectives:

Students will be able to:

- Describe the role that soil plays in a healthy ecosystem.
- Explain how compost is produced and how it benefits plants.
- Identify producers, consumers and decomposers and their roles in the soil food web.

Vocabulary: Sand, silt, clay, soil, particle, producer, consumer, decomposer, plants, animals, bacteria, fungi, food web.

Materials:

- Soil Food Web Poster
- Decomposer Tag Costumes
- Mason Jars for Soil Tests
- Compost Materials

Discussion Questions:

Why is soil important?

What materials are found in soil?

What animals live in soil?

Can you describe the soil food web?

What is a producer, consumer, and decomposer?

What role does soil play in producing food?

Lesson Background

Soil is the foundation of the food and other materials that help sustain us. The food we eat, the clothes we wear, and the homes we live in, could not have been produced without the help of soil. Soil is formed from weathered rock, minerals, and different living and dead **plants, animals, bacteria, and fungi**. Soil is found on the top layer of the earth and develops over millions of years as bedrock is broken down by wind, water, and microorganisms. Throughout this lesson, students learn about soil composition, and why soil is essential to plant growth. Students will also learn about all of the creatures living in the

Lesson VI: Soil and Compost

soil and how they are all connected by the **soil food web**.

Soil is important for sustaining life for numerous reasons, including: Producing and absorbing gases, serving as a medium for plant growth, filtering water and waste, and providing a home to organisms (plants, fungi, bacteria).

Soil is made up of different sized **particles**. Particles are the smaller pieces that make up soil. **Clay** is made of tiny particles that make it difficult for water to flow through the soil. In contrast, **sand** is made up of larger particles, and allows water to drain easily. **Silt** has particles that are larger than clay, but smaller than silt. These three materials make up soil texture, and impact the soils' ability to retain water, which impacts how well certain types of plants can grow in the soil.

The soil food web and the web of life, are important concepts for students to understand. The web of life is the connection between different life forms (plants, animals, microorganisms and decomposers, fungi, etc). The food web describes the transfer of energy between life forms in the ecosystem. A **producer** produces energy from the sun using photosynthesis (plants, algae, etc). A **consumer** consumes plants, or other consumers, to get energy (herbivores, carnivores, and omnivores). A **decomposer** consumes dead, organic material to produce energy, is vital to soil production and reduces organic waste in the ecosystem (such as worms).

Lesson VI Procedure

Activity	Summary	Time Needed
Opening	Attendance, check-in about previous week, rules reminder, agenda for the class.	5-10 minutes
Garden Time K-5 th	<p>Soil Samples: Have students take soil samples from several different parts of the garden (in jars). Add water and shake. Tell students they will examine the jars next week to see the different parts of the soil (clay, silt, sand). (See attached instructions).</p> <p>Compost Exploration: If your garden has a compost pile, work with students to turn the compost pile, add green and brown materials, and explore what is living in the pile.</p> <p>Check on plants planted in previous weeks and observe growth. Plant more seeds relevant to season if garden space allows.</p>	30-45 minutes
Compost Chaos	Play Compost Chaos (see attached instructions)	15-40 minutes
Soil Food Web Activity	Lead students in a discussion about the soil food web and the roles of producers, consumers, and decomposers (see background information above). Have students make a food web collage using pictures from magazines or their own drawings. Make sure to have examples of producers, consumers, and decomposers available for students. Have the students draw lines showing how the different plants and animals are connected (i.e. connect cows to grass, because cows consume grass).	20 minutes
Food and Nutrition	Prepare snack for students (i.e. snack of roasted root vegetables that grow directly in the soil). Have students wash hands and serve snack.	15 minutes
Closing	Clean up. Have students split into pairs, and share what a decomposer is, and why decomposers are important for soil and plant health. Fill out feedback form*. Dismiss class. * Or evaluation method of your choice.	5-10 minutes

Lesson VI: Game/Activity Instructions

Soil Composition

Description: Learn about soil composition and texture through a hands on exploration activity.

Grades: K-5th

Materials:

- Trowels
- 3 Glass Jars
- Water
- Soap (if available)

Procedure:

1. Work with students to fill up each jar with soil from three different areas in the school garden. This works best if you dig about 6-12 inches into the soil before gathering the soil. If you have time, sift the soil (removing vegetable matter, rocks, and sometimes worms) before filling the jars. Fill about 2/3 full.
2. Label jars with the location in the garden.
3. Add water to each of the jars (close to the top). Put on the lids.
4. Have students shake the jars.
5. Tell students that the soil will settle into three different layers (sand, silt, and clay). Depending on the area in the garden, the different jars could look different.
6. Let rest for at least week.
7. Observe the soil layers in upcoming weeks. Discuss with students how clay, sand, and silt allow water to flow differently through the soil, impacting different plants' ability to grow.

Adapted from Fine Gardening Online. (See References)

Compost Chaos

Author: Bob Hatton

Illustrations: Jon Wagner

Grade level: 3rd-5th

Overview: This garden-based education game is a fun way to familiarize students with some basic composting concepts.

Purpose: Composting is an important facet of organic gardening and a tremendous waste-reduction practice. Teaching students about composting helps them become more aware of where their food waste goes and what they can do about it. It is also a useful skill to teach students if they ever want to practice gardening at home or in the future.

Objectives: After playing this game, students should come away with the following:

- 1) Compost piles should be alternately layered with “green” and “brown” materials.
- 2) Compost piles should be turned and watered to speed up the decomposition process
- 3) Worm bins are an option for composting food scraps.
- 4) Using a tumbler is a method for composting
- 5) Creating your own compost can be a fun and exciting endeavor

Materials:

Enough room for everyone to stand in a circle.

Procedure:

- Begin with an open-ended question that asks about different ways that we build soil or different ways that we compost.
- As students supply answers, pull out a little more detail. For example, a student might say, “We make compost in the bins outside.” Educator: “Yes. That’s right. What kinds of things do we put in the bins?” After the students have supplied some answers, the educator might say, “Yeah. Great. So straw, leaves, and twigs are all carbon-rich materials and generally brown colored so we call them the ‘browns.’ The vegetable trimmings and such are often leafy and green so we call them the ‘greens.’ Ideally, we add browns and greens to the compost in layers. What else do we need to do to the compost? Does it just sit there?” etc.
- Ideally, the students already have seen some or all of this in action so it need not be so talky. The main points can be communicated during the explanation of the gesture combinations in the game.
- To play the game, have the students form a circle. While explaining the rules, it is probably best for the educator to be part of the circle but be sure to explain that someone will be standing in the middle of the circle. The person standing in the middle of the circle is the Composter.
- The Composter stands in the center of the circle, spins around, points at one of the participants, and calls out one of the catch phrases.
- When the Composter directs his/her finger towards someone in the circle and calls out a catch phrase, there are corresponding actions that the pointed-at participant and the participants to the immediate right and left of that person must take.
- The participant who is slowest to react (if that is clear) takes the Composter’s place in the middle and the game continues. If all of the participants are reacting quickly and/or simultaneously, then the Composter stays in the middle and finds someone else to point at. This game can continue indefinitely. The possible catch phrases that the Composter

can utter: Worm Bin, Tumbler, Layer Brown, Layer Green, Compost -Water, Compost - Turn, and Compost –Done!

The corresponding gesture combinations do not all need to be used and, if they are, they should be introduced incrementally instead of all at once. Please see the next page for illustrations of the gesture combinations:

- Worm Bin: Pointed-at wiggles side to side like a worm, sides turn in and stretch out their arms with thumbs up – touching right fingertips to the other’s left fingertips and vice versa.
- Tumbler: Pointed-at wiggles front to back – rounding and arching their back, sides mime the action of turning the handle on a compost tumbler.
- Layer Brown: Pointed-at squats, sides turn towards each other and try to beat the other person to say the word “Green” (opposite for Layer Green.)
- Compost – Water: Pointed-at grabs nose with thumb and index finger of one hand and mimes submerging into water, sides hold their hands over the pointed-at’s head and mime the action of flicking water off of their finger tips
- Compost – Turn: Pointed-at spins around in a circle, sides mime the action of turning a compost pile with a pitchfork.
- Compost - Done: Pointed at squats, makes a fist with one hand and thrusts that same elbow in towards their stomach; sides turn towards each other and do a high five, all three exclaim, “Yes!” (or perhaps “Black Gold, Baby!”)

Variation:

These Compost Chaos combinations could also be part of a larger game called “Soil Builders” that would also include the following.

- Green Manure: Pointed-at drops head, sides mime slashing action.
- Sheet-mulch: Pointed-at sticks one of their hands out and a little bit down, sides turn in and stick their hands in the same place. The three hands will form a stack. The slowest of the three switches with the pointer.
- Cover Crop: Pointed-at ducks and covers head, sides turn in and stick their arms up and out to form an arch.

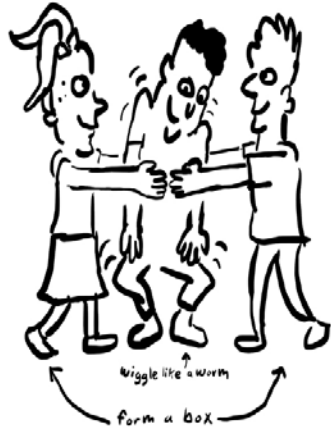
Debriefing the Game:

When the students are starting to show signs of tiring of this game or it is time for the next rotation, try to do a quick debriefing before moving on. You can ask some of the same questions as you asked before the game started and you should get some quicker and more solid responses. “Did you have fun?” or “Did you like that game?” are fair questions to ask as well. Reinforcing composting concepts is the educational objective but more importantly, this game should be fun. Hopefully, the students are associating these composting concepts with good times in the garden – having fun wiggling like a worm and sharing a few laughs as they watch their classmates spin around in circles, etc.

COMPOST CHAOS

JW 5-5-11

Worm bin



Layer Brown/Green



Tumbler



Compost Turn



Water



Yes! **DONE** Yes!



Lesson VII: Wondrous Worms

Title: Wondrous Worms

Time Needed: 60-120 minutes

Age/Grade: K-5th

Lesson Objectives:

Students will be able to:

- Describe basics of how worm bin composting works.
- Explain why worms are important for soil & plant health.
- List the main anatomical parts of a worm.

Vocabulary: Decomposer, casting, gizzard, red wiggler, hermaphrodite, clitellum, worm bin, and bedding.

Materials:

- Worm Bin
- Worm placemats (1 per student)
- Popsicle sticks (1 per student)
- Worm anatomy poster
- Book: Worms Eat Our Garbage or Diary of a Worm
- Optional activities: Supplies to make a school worm bin (See Worm Bin Instructions) or mini- Worm Bin

Discussion Questions:

Worm Ecology: Where do earthworms live? Why do we call them earthworms? How do worms move? (wiggle through soil, moving it all around)

Worm Anatomy: What does a worm eat? Can a worm bite you? If a worm has no teeth how does it crush up its food? How do you know a worm is all grown up? (Clitellum for reproduction)

Worm Bin: What does a worm need to live? (If this is confusing ask kids about another animal that they know such as a tiger or other charismatic creature). Why would we want to keep worms in a bin?

Lesson Background

Ecology: Worms are **decomposers**. They digest dead and decaying organic matter that is then excreted as **castings**. The castings are excellent fertilizers high in nitrogen, phosphorus and potassium. Thus by digesting organic material and excreting it they help to make healthy soil. They also help soil health by loosening the soil as they create pathways while seeking out food. These pathways allow air and water into the soil. This makes them true **tillers**,

Lesson VII: Wondrous Worms

organisms that turn and loosen the soil.

Biology: Segmented worms, such as earthworms, have a very interesting anatomy. Segmented worms have no teeth, and instead mash up their food in a **gizzard** that contains some sand and grit from the organic matter they eat. While a worm has no teeth it does have plenty of hearts. Segmented worms have **five hearts** that beat as one and can be seen towards the anterior (mouth end) of the worm. Segmented worms are also **hermaphrodites** meaning they have both male and female reproductive organs and can reproduce asexually. A worm is of reproductive age once it has a **clitellum**, which is a band around the front end of the worm. Worm cocoons, which are small, lemon shaped and hold 3-5 baby worms, are secreted from the clitellum.

Worm Bins: The most common variety of worms used in worm bins is called '**Red Wigglers.**' The **worm bin** is filled with shredded newspaper called **bedding** that keeps the worms protected from light and provides a moist, soil like environment. As food scraps are added to the worm bin the worms excrete castings we can use in our garden. In good conditions a pound of worms can eat $\frac{1}{2}$ **pound** of food **each day**. Red wigglers are a great variety for bins due to their high tolerance to varying temperatures, and are fast producers (8 worms can produce 1,500 babies in 6 months).

Lesson VII Procedure

Activity	Summary	Time Needed
Opening	Attendance, check-in about previous week, rules reminder, agenda for the class.	5-10 minutes
Introducing Worms!	<p>Show worm anatomy poster and explain the different parts of the worm</p> <p>Worm Observation: Give each student a worm placemat and encourage them to gently examine and observe the worm. Make sure to consider students who are less comfortable touching worms and offer popsicle sticks to use for gently moving the worms around.</p> <p>Worm Bin Exploration and Investigation: Look inside a working worm bin with the students, discuss their observations. If there is not a worm bin available, see attached instructions for making a worm bin with the students.</p> <p>If time allows, make miniature worm bins using old yogurt containers and worms from an existing bin. Send kids home with a few worms and some scraps.</p>	15-25 minutes
Garden Time	<p>Explore the garden for evidence of decomposers (earthworms, red wigglers, as well as mushrooms). Ask students to compare and contrast the decomposers they find in the garden with those in the worm bin.</p> <p>Plant seeds with students, and add worm castings and discuss how castings help provide nutrients for the plants</p>	15-20 minutes
Decomposer Tag	Play Decomposer Tag (see attached instructions).	10-15 minutes
Soil Poems 3 rd -5 th	Work with students to create soil and worm poems (see attached instructions).	10-15 minutes
Food and Nutrition	Provide tasting to students. If possible, add fruit or vegetable scraps into the worm bin	10-15 minutes

Lesson VII Procedure

Activity	Summary	Time Needed
Closing	Clean up. In pairs, have students describe how a worm bin works and why worms are useful in the garden. Fill out feedback form*. Dismiss class. * Or evaluation method of your choice.	5-10 minutes

Lesson VII: Game/Activity Instructions

Decomposer Tag

Description:

Students play a freeze tag game where frost tries to tag and freeze the plants. The earthworms unfreeze the nutrients trapped in dead plants, allowing them to return to the cycle of life.

Grade: K-5th

Time: 5-20 minutes

Materials: 2-5 light colored and 1-2 dark colored bandanas (optional).

Procedure:

1. One student is *FROST* (dark colored bandana).
2. 2-5 Students are *EARTHWORMS* (light colored bandanas). All other students are *PLANTS*
3. *FROST* kills plants by tagging them. If plants are tagged, they are frozen until one of the decomposers unfreezes them. The decomposers unfreeze the plants as fast as or faster than death freezes them.
4. The game does not end. Give students the opportunity to play the different roles (using short games). At the end, ask students about how this relates to the web of life and decomposers.

Safety:

Make sure to designate safe boundary lines for the playfield, and model the difference between a gentle tag and a touch that could hurt.

Variation:

To demonstrate that life would stop without decomposers recycling dead things, you can allow *FROST* to tag and freeze the *EARTHWORMS* along with the *PLANTS*. The game and life on earth *END* when everyone is frozen except *FROST*.

Soil Poems

Description: Make observations and use describing words about different types of soil. Create group soil poems.

Grade: 3rd-5th

Time: 10-20 minutes

Materials:



- 3 clear containers (ideally jars) containing compost, garden soil (including rocks/clay), and worm castings.
- Squares of paper (15 for each container).
- Pencils
- Containers for paper strips.

Procedure:

1. Lead students in a discussion about words we can use to describe different soil types, such as brown, earthy, moist, sticky, crumbly, soft, etc.
2. Divide students into three groups and give each group a container filled with one type of soil, and have the students make observations about their soil. Tell them to pick a word they would use to describe the soil and write it on one strip of paper, fold it, and put it into a container.
3. When each student has done one word for their group's soil type, have the groups rotate the next station. Ask each student to write a new word that describes the next type of soil. Remind them to think about the differences they notice between the soil types.
4. After completing all three rotations, ask four or five different students to draw slips representing each soil type.
5. Write the words in order, to create a soil poem for each container of soil.

Adapted from: "Sensual Soil" The Growing Classroom: Garden-Based Science. (See References)

Creating A Worm Bin

Materials:

- 1 plastic storage tub (10-18 gal)
- Newspaper
- Redworms (aka Red Wiggler Worms)
- Drill
- Water
- Food scraps



Process:

- Drill holes all around sides of bin and in lid (for air flow).
- Make drainage hole at bottom. Cork the hole, or tilt bin so liquid flows away from hole
- Shred newspaper, and wet so it's like a wrung-out sponge.
- Fill bin ¾ with moistened shredded newspaper
- Put some soil or castings over newspaper (need some kind of grit if don't have castings)
- Add worms
- Cover with another layer of moist newspaper.

Feeding:

- Worms will eat about ½ their weight each day.
- Add fruit and veggie scraps, tea bags & coffee grinds, eggshells.
- No meat, dairy or oils.
- Chop up large pieces – the worms can break it down faster with more surface area.
- Bury food completely under bedding.
- Rotate the spot where you place the food.
- If food starts rotting in the bin, reduce the amount you are adding.
- As the worms multiply, you will be able to add more food.

Bin Habitat:

- Add more bedding when needed (maintain a cover of at least 2 inches of bedding)
- Keep bedding moist at all times
- Occasionally drain out excess liquid
- Keep temperature between 55 and 80 degrees at all times.

Harvesting the Castings

The compost is ready to harvest when it looks like soil, usually every 2-6 months (frequency will depend on bin size, amount of worms, and how much food is going in).

Two methods:

Migration method:

- Move all bedding to one side of the bin
- Only add food to the side with the bedding
- Over 1-2 months, the worms will all migrate to that side of the bin, leaving the other side worm-free castings.
- Harvest the castings from the worm-free side.
- Then move the bedding to the other side, start adding food to that side.
- Harvest the other side 1-2 months later.



Dump, divide, and sort:

- Make little mounds of compost
- The worms will move down to avoid the light
- After a few minute, remove compost off the top
- Repeat until you have removed all the compost, and little piles of worms remain.

USING THE COMPOST:

Add a small handful to the base of the plant, lightly dig it into the surrounding soil, and then water it. This will give your plants a good nutrient boost.

Lesson VIII: Celebration!

Title: Celebration!

Time Needed: 60-120 minutes

Age/Grade: K-5th

Materials:

- Tools for harvesting
- Seeds appropriate for season
- Garden jeopardy materials (see attached instructions)
- Game materials for several different garden games (ladybug aphid tag, decomposer tag, etc)

Lesson Background

The last lesson of the term is a great opportunity to review what was learned and celebrate the experiences and accomplishments of a term of Garden Club. Encourage a festive atmosphere by providing a special tasting, and spend time reflecting on what was learned and tasted in Garden Club that term. Giving students an opportunity to choose a favorite game to play again is a fun way to reinforce a specific garden topic, and garden jeopardy is a great way to do a comprehensive review of the lessons while still having fun.

Lesson VIII Procedure

Activity	Summary	Time Needed
Opening	Attendance, check-in about previous week, rules reminder, agenda for the class.	5-10 minutes
What did you eat yesterday?	Ask students what they ate yesterday. Talk about ways to add more fruits and vegetables into each meal. For example, if they ate a hamburger, add a slice of tomato...	10 minutes
Garden Jeopardy	Play Garden Jeopardy (see attached instructions).	25-35 minutes
Garden Time	Harvest vegetables planted by students earlier in the term, and check on plants that are not ready to harvest. Plant seeds for the following term if appropriate to the season.	15 minutes
Free Choice Game	Review the games played over the term of Garden Club (decomposer tag, ladybug aphid tag, pollinator tag, etc) and have students vote and choose one game to play again.	15 minutes
Post Evaluation	Pass our post-evaluations (see overview section). Help younger students complete the evaluations by reading them out loud and walking the class through the process together.	15 minutes
Food and Nutrition	Harvest or prepare a special tasting and talk with students about the importance of eating fruits and veggies every day. Review the vegetables that have been tasted that term in Garden Club and ask which were students' favorites. Two great options for a special tasting include Kiwi Parfaits and Rainbow Smoothies (recipes attached).	15 minutes
Closing	Clean up, fill out feedback form*. Dismiss class. * Or evaluation method of your choice.	5-10 minutes



Lesson VIII: Game/Activity Instructions

Garden Jeopardy!

Description: Review and reflect on garden lesson topics.

Grade: 3rd-5th

Time: 25-35 minutes

Materials:

- White board or flip chart
- Paper

Procedure:

1. Make a chart on a white board or flip chart, with five columns and six rows. In each of the boxes on the first row, write a category name, i.e. “bugs and insects,” “soil and compost,” “worms,” etc.
2. Move down to the second row. Write 100 in each box in the second row, 200 in the boxes in the third row, 300 in the fourth row, and 400 in the fifth row, and 500 in the 6th row.
3. Make a master sheet with each topic at the top, and 5 questions and answers related to each topic, increasing in difficulty from easiest to hardest. Mark each question 100, 200, 300, 400, or 500, with 100 being the easiest, and 500 being the hardest.
4. Divide students into even teams. Have each team take turns choosing a category and a number, and ask them the corresponding question. You can ask all the teams, or just that specific team. Erase the number from the board when you ask the question.
5. Keep score if you want, by tallying the numbers from each question answered correctly. You can also subtract the number of points if they answer incorrectly.
6. Optional: Tell the children their total scores. Have each team choose an amount of points, equal or lesser value to their score, to wager for the final Jeopardy round. Have each team right down the amount of a piece of paper and turn into you. Ask an extra hard “Final Jeopardy” question. Each team writes down their answer and turns it into you. Subtract or add their wager to their score after receiving their answers. The team with the most points wins.

Recipe: Kiwi Parfaits

4 medium-sized kiwis
1 Tb sugar or honey (if using plain yogurt)
juice of half a lemon or 1 ½ tbsp. lemon juice (optional)
Plain or vanilla yogurt
Graham crackers (optional)

Put graham crackers in plastic bag or between wax paper and press into crumbs. Cut each kiwi in half and scoop out the flesh. Put in bowl with sugar or honey and the lemon juice; use a fork to mash the kiwis into sauce. It's okay if it's lumpy!

Sprinkle a layer of graham crackers in the bottom of a glass or bowl. Layer with a scoop of vanilla yogurt, and then the kiwi sauce. Repeat with 1-2 more layers ending with the kiwi sauce on top. Eat immediately, or the yogurt will begin to separate.

Recipe: Rainbow Smoothies

Plain or vanilla yogurt
Strawberries, raspberries, blueberries, or other fruit, frozen if possible
Bananas
Spinach
Orange juice or milk (optional)

Blend all ingredients in a blender. If you don't have frozen fruit, add a handful of ice before blending. Thin with orange juice or milk if it seems too thick.

