

Food Garden Planning and Design

Grade K to 7
Science, Art, Math
1 hour and 20 min.



information
for the
teacher



Photo Credit: "Upper Garden, 3 beds" by Patrick Breen (pdbreen on flickr), image reversed, used under Creative Commons license 2.0 (CC-BY-2.0).

Above: A garden design that consists of three raised beds. Note that each garden bed is only three feet wide, and thus narrow enough for a person to reach into the centre of the garden when standing beside the bed. Trellises have been placed at the back of each raised bed to support the tomato and squash plants that have been planted there, while the smaller crops sit at the front of the beds.

Below: Cabbage plants that have been grown in a raised bed. Note the marigold flowers in the garden. Marigolds, which have a natural pesticide in their roots, are a good companion flower for some vegetables.

Photo Credit: "Winter Harvest: Cabbage" by Korye Logan (KoryeLogan on flickr), used under Creative Commons license 2.0 (CC-BY-2.0).



vocab

Annual Plants which complete their life cycle in one year, and die at the end of the season (eg. lettuce, corn, radishes).

Perennial Plants which live longer than 2 years (eg. trees, bushes, berries, rhubarb).

What should I consider when planning a garden? When talking about garden planning and design, the first question is always where to site a food garden. For food gardens in B.C., the site should be south facing, with full sun exposure, and with easy access to water. Another equally important aspect is access to plants without walking on the garden. Is the garden in boxes, or raised beds? Where will the paths go, and can you reach all parts of the garden from a path, walkway or stepping stone?

Which crops can I plant together? When designing a garden it is useful to use companion planting as a practice. Some crops grow best when situated in close proximity to another crop. This may be because one crop attracts pollinators more easily, or because they may deter harmful garden pests. Some crops such as beans and peas produce nitrogen, a much-needed essential nutrient, which is often found in limited amounts in soils. Other crops provide shade and support to those crops that need them. The First Nations' "Three Sisters Garden" is a prime example of sustainable companion planting, where beans, squash and corn were planted together: the corn provided the trellis for the beans, the squash provided a living mulch to keep weeds down and keep soil moisture levels high, and the beans provided added nitrogen for the other 2 crops. This lesson can be adapted to any age.

Below: A box of vegetables with carrots planted in the middle and onions companion-planted around. Carrot root fly is attracted to the smell of carrots, and the heavily-scented onions help to confuse these pests and keep them away.

Photo Credit: "Take that! You pesky carrot fly varmints!" by Karen Blakeman (karenblakeman on flickr), used under Creative Commons license 2.0 (CC-BY-2.0).



Companion Planting The planting of different crops in close proximity to increase crop productivity by assisting in nutrient uptake, controlling pests, increasing pollination or beneficial insects. It is a useful organic gardening or agricultural practice.

Crop Rotation Growing dissimilar food crops sequentially to avoid a build up of pathogens in the soil, and to reduce nutrient loss.

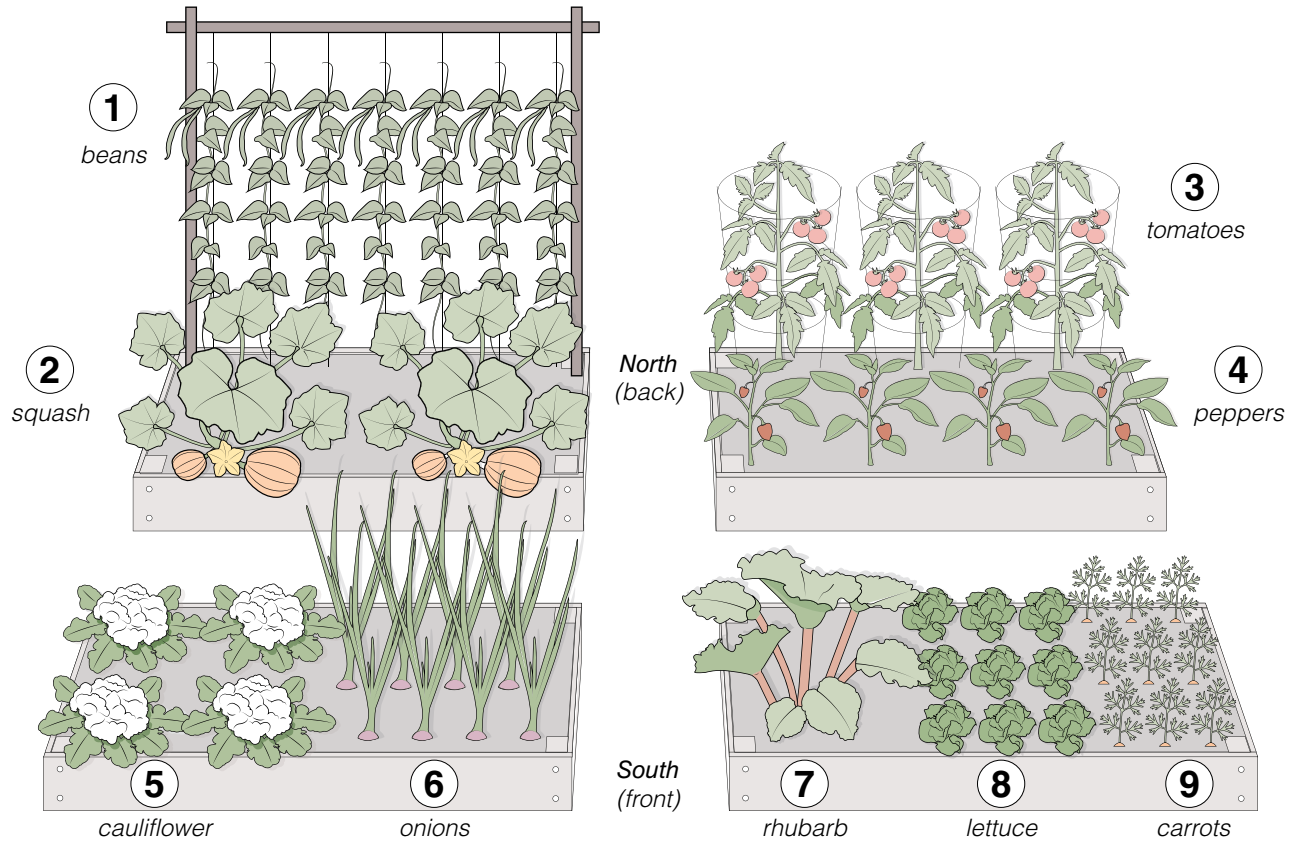
Part 1: Intro to Garden Design

Learn about what constitutes a good food garden site and how to plan and design a garden.



MATERIALS

- “What’s Growing in the Garden” handout (1 per student)
- “Companion Planting” handout (1 per student, to be used in both parts of this lesson)



LESSON

Introductory Discussion

Who has a garden at home? Who grows food at home? We are going to design our own ideal food garden.

Give the “What’s Growing...” handout to the students and have them do the vegetable matching activity (see answers above). Use the picture to lead the following discussion:

1. Initial considerations: What might we need to think about before we start? (Location, full sun, water source, size, soil requirements). Where will our garden go? What shape do we want to make our garden? How should we reach our plants without stepping on them? (Raised beds, paths, stepping stones, garden boxes).

Look at the garden picture.

- » What direction does the garden face? (*south*)
- » How can people step around the plants in the garden? (*plants are in raised beds with pathways in between*)

2. Plant size: Some plants grow very large and some stay quite small.

Look at the garden picture.

- » Are there some plants that take up a lot of space? (*rhubarb, squash*)
- » Which plants are tall? (*beans, tomatoes*)
Which plants are short? (*lettuce, carrots*)
- » Are the tall plants or the short plants at the back (north side) of the garden? (*tall ones*)
- » Why do you think this is? (*so that all plants get equal sunlight*)

3. Supports for plants: Some plants, such as peas and beans, are vines that need a trellis or fence to grow up.

Look at the garden picture.

- » Can you see some examples of supports? (*bean trellis, tomato cages*)
- » Can you think of any other vegetable crops that might need support when growing? (*peas, cucumbers, squash*)

4. Perennials and annuals: Talk about the difference between perennials and annuals. Perennial plants live for more than 2 years. Most vegetable crops are annuals, and live for only one season. In your garden beds, you may wish to designate a portion of your garden for perennial plants such as herbs, berries, rhubarb, and asparagus.

Look at the garden picture.

- » Can you see any perennial plants? (*rhubarb*)

5. Companion planting: With intermediate students, introduce the idea of companion planting. Some plants grow well together, and some do not. Hand out the companion planting chart included with this lesson.

Look at the garden picture.

- » Can you see any examples of companion planting? (*beans/squash, tomatoes/peppers, cauliflower/onions, carrots/lettuce*)

Part 2: Planning a Garden

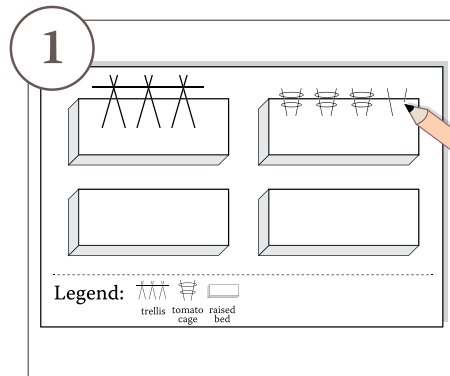
Create a garden plan on paper.
Learn about crop rotation and
its importance in gardening.



MATERIALS

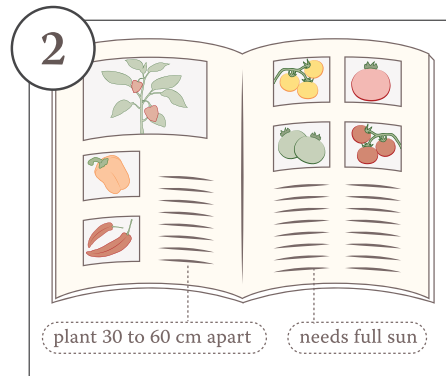
- Large 11 x 17 white paper (one sheet per student)
- Graph paper for older students (optional)
- Pencils, crayons, felt pens or pencil crayons
- Rulers
- Seed catalogues
- Seed packets (empty ones are good, so students can read how big the plants will grow)
- Garden design reference books from library
- “Food Plants for the Garden” worksheet (1 per student)
- “A Garden Plan” picture – show to students as an example

LESSON

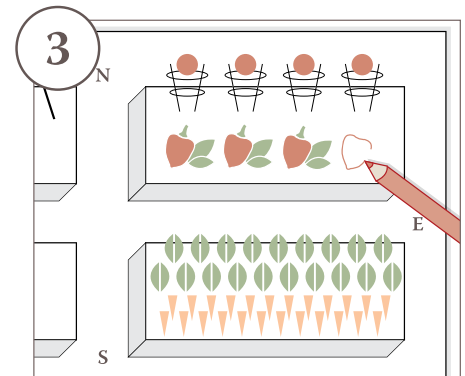


1. Create an outline of the garden.

Each student will receive a large 11 x 17 piece of white paper. Using a pencil, sketch out the garden shape and size on the paper. Include trellises, pathways, stepping stones. Use symbols and pictures of vegetables on your design plan and leave space for a legend.

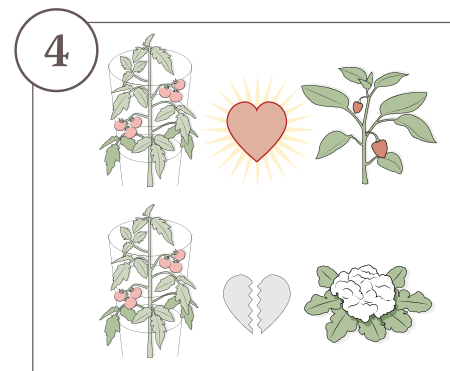


2. Research food plants. Using seed catalogues, garden books, or seed packets choose the vegetables and fruits you would like to grow in your garden. Research each one to see what their planting requirements are. Do they need support? Do they grow very large? Do they need full sun, or are they best grown in partial shade, under the leaves of another larger plant? Students can record their findings on the “Food Plants for the Garden” worksheet.

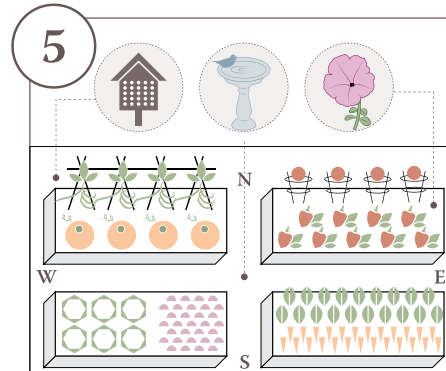


3. Draw vegetables in the garden.

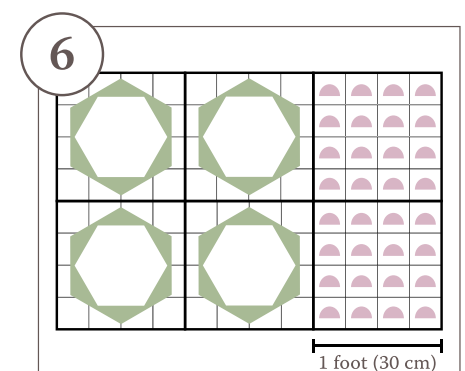
Put cardinal points on the garden design. Trellises and tall plants such as corn and sunflowers should be placed at the back (north side) of the design, whereas short plants such as carrots and lettuce should be placed at the front (southside) of the design to ensure that all crops have full sun.



4. Companion planting. Using the chart handout, use the practice of companion planting while designing your garden. Which crops grow best with which crops? Which ones should be grown apart?



5.a. Add other garden elements. Younger students can focus on a strictly conceptual design. Elements such as bee houses, bird baths and pollinator flowers could also be added to the designs.



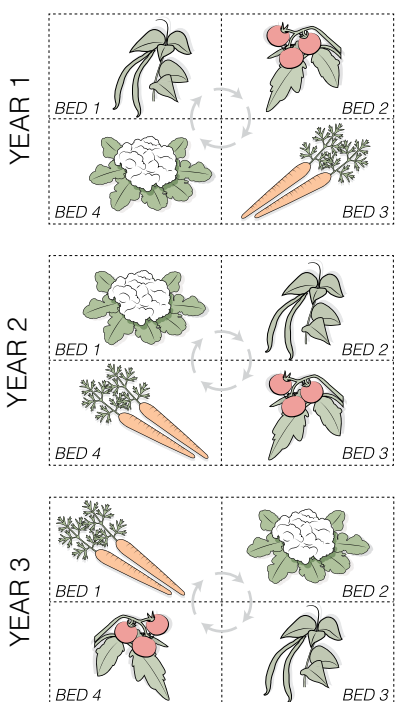
5.b. Scale drawing / crop rotation. For older students, one can introduce the idea of scale drawing and use graph paper for their garden design. Introduce the concept of crop rotation (see notes on next page). If they were to plant their gardens the year after, what changes would they make to their garden design?

When students are finished, they can share the different designs with each other. Ask students: what are the main ideas we need to think about when we draw up a garden design?

CROP ROTATION

an explanation guide

Crop rotation is changing crop location every year so you are not growing the same thing in the same garden bed each year. Why rotate crops?



- Crop rotation reduces the build up of pests and disease in the soil. Each crop family is susceptible to a similar set of weaknesses (eg. tomatoes and potatoes can experience blight, peas can experience root rot) which can remain in the soil into the next year and beyond. By rotating crop families, you are putting the plant in a different area of soil and thus reducing the risk of disease and pests.
- Crop rotation keeps the soil from becoming exhausted of certain nutrients. Every crop takes different quantities of nutrients (N, P, K) and micro-elements (Ca, Mg, S, B, Cu, Fe etc) and from different soil depths (based on root length). Varying the crops will make the best use of your soil. Some crops, such as beans and peas, add nitrogen into the soil. Other crops, such as tomatoes, take a lot of nitrogen from the soil. Therefore, a site planted with tomatoes in year one will benefit from a nitrogen-replenishing bean crop grown in the same spot in year two.
- Rotating crops will reduce weeds. Foliage of some plants is dense, reducing weeds, while other crops are less dense and more weeds can grow.
- **NOTE:** When practicing crop rotation, keep similar plants together so they can have the same soil treatment (eg. carrots need NO compost or fertilizer, otherwise they fork).

references
&
resources

BOOKS

Bartholomew, Mel. 2005. **All New Square Foot Gardening**. Cool Springs Press: Franklin, Tennessee.

» This book outlines the "square foot" gardening method. It would be a great starting point for developing a mathematical perimeter and area lesson around garden design, or to introduce scale drawing using graph paper.

Bellamy, Andrea. 2010. **Sugar Snaps and Strawberries**. Timber Press: Portland, Oregon.

» This book gives an overview of many gardening topics (eg. soils, plants, composting) with a focus on small-space food gardening. It would be a great introductory resource for teachers who are new to gardening.

Cohen, Whitney and John Fisher. 2012. **Gardening Projects for Kids**. Timber Press: Portland, Oregon.

» This book has instructions for many fun gardening activities to do with kids (eg. making mosaic stepping stones, plant markers from rocks, bird houses from gourds, etc). A great resource for finding lesson extensions.

ONLINE

- **Vegetable Garden Layouts:**

<http://www.squidoo.com/VegetableGardenLayout>

- **Crop Rotation:**

http://www.gardenorganic.org.uk/schools_organic_network/leaflets/CropRotation.pdf

- **Companion Planting:**

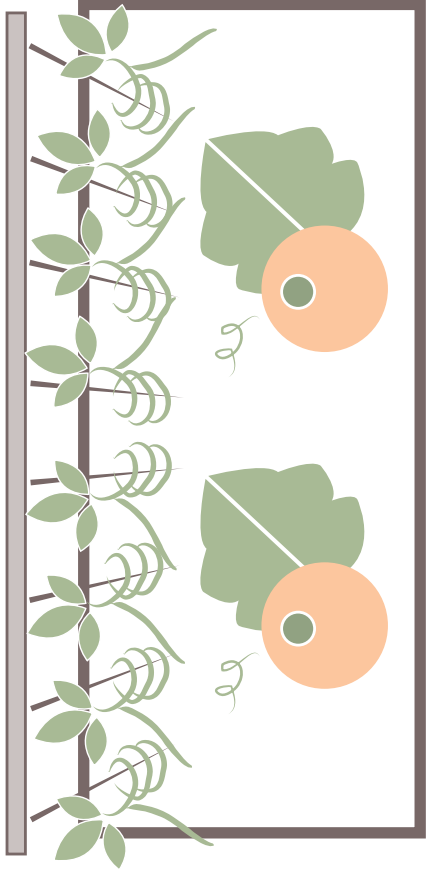
http://www.howtogardenadvice.com/garden_info/companion_gardening.html

<http://www.companionplanting.net/ListofCompanionPlants.html>

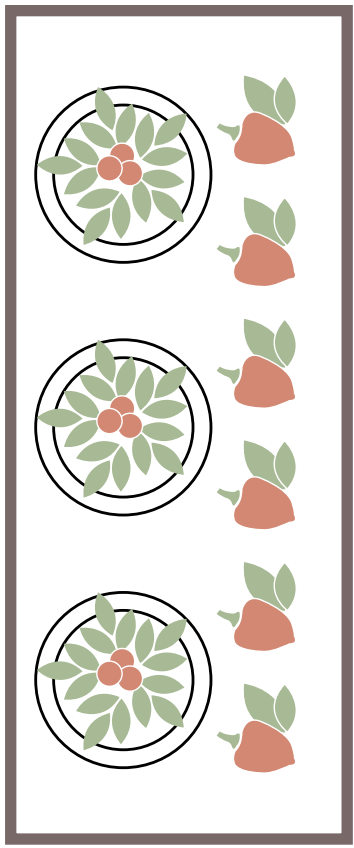
credits

Lesson developed and written by Catriona Gordon. Design by Lisa Rilkoﬀ.

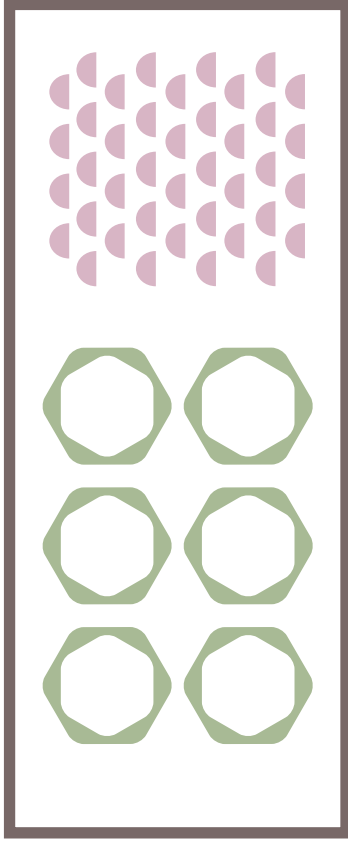
A Garden Plan



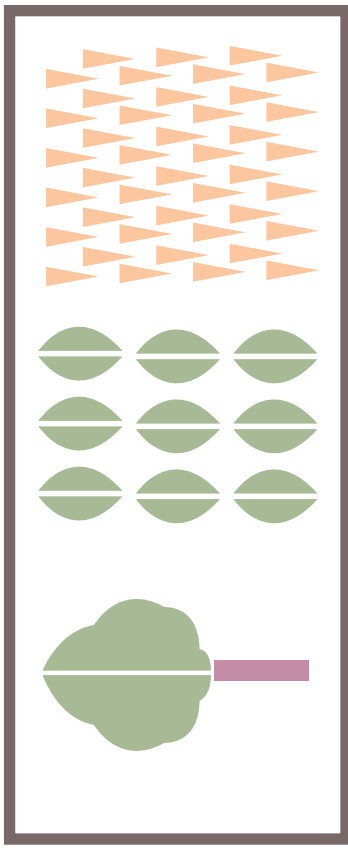
N



W



E



S

Legend



raised bed



trellis



tomato cage



beans



carrots



cauliflower



lettuce



onions



peppers



rhubarb



squash



tomatoes