SQUARE-FOOT SEEDS

Article by Amy Bowman with the Plants for Human Health Institute's STEM Education at NC State University

Square-foot gardening is a system of spacing plants within a framework of a bed gridded into one-square foot sections. It is a gardening method ready-made for youth and makes growing vegetables easy and fun.

Materials

- Variety of seeds collected for exploration
- Unbleached paper towels, 1' x 1'
- Planting guide or square-foot gardening guide
- Markers
- School glue
- Seeds for planting

FIGURE 5-1 Raised beds make square-foot gardening easy.

GETTING STARTED

Allow students to explore a variety of seeds from very familiar seeds like citrus, apple, sunflower, and acorn to more unusual seeds like avocado, coconut, mango, poppy, and sesame.

A variety of questions can be posed at this point depending on grade level standards.

- Are seeds living or non-living?
- What might grow from each of these?
- What does a seed become?
- Where does a seed come from?
- Do seeds resemble their parent plant, or do seeds of similar fruits (ex. citrus) resemble each other?
- What will we need for these seeds to germinate and grow?
- Will a large seed grow a larger plant than a small seed?
- How much space does each seed need?

FIGURE 5-2 Explore different seeds to build wonder and curiosity about plants.

ACTIVITY

Timeframe: 45-60 minutes

Students can work as individuals, pairs, or groups for this activity.

1. Each student/group will need a 1' x 1' paper towel and a planting guide or square-foot guide.
2. Using the planting guide for upper grade levels or the square-foot guide for lower grade levels, have students determine how many seeds will fit in one square foot of area.
3. At this point you may want to do one or more of the following, depending on your grade level and goals.
   - Fold the paper towel in half, fourths, ninths, or sixteenths, depending on the seed requirements. They may want to trace the squares to make them more visible.
   - Measure with standard or non-standard units and mark the needed grid.

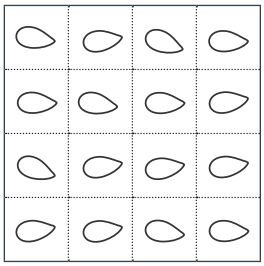
FIGURE 5-3 Using lumber already cut to length to make a raised bed. This requires few cuts and students of all ages can help build the beds.

4. Once the grid has been made, students will put a drop of glue in the center of each square and attach one seed to the drop of glue.
   - To explore why plants need space, place some of the seeds according to the planting guide and seed others very heavily to see what happens when plants do not have the space they need to grow. (Radishes work well because they can be harvested in 25-30 days.) Students can compare the size of the vegetables harvested.
5. Students should put their names on the paper towel and set them aside to dry. The seeds will not germinate until they are placed in the soil and watered and may be stored in a dry location until you are ready to plant them.
6. When you are ready to plant in the garden, simply lay the paper towel down on an available square foot and cover with a thin layer of soil so that the paper towel is no longer visible. Water gently; the water will initiate germination. Consult seed packets to see how long the seeds will take to germinate.
7. This is a great time to talk about what will happen to the paper towel.

SQUARE FOOT PLANTING GUIDE

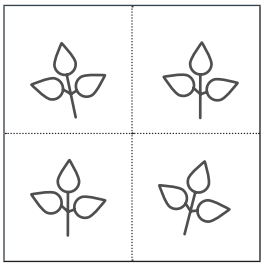
Use the charts below to guide your planting.

- **16 plants per square foot**



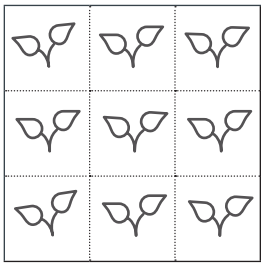
carrot
radish
parsnip
mustard greens
scallions
chives
beet

- **4 plants per square foot**



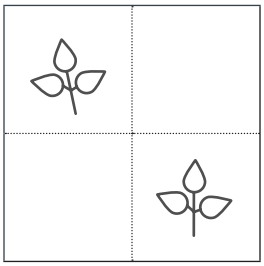
lettuce
Swiss chard
corn
basil
thyme
quinoa

- **9 plants per square foot**



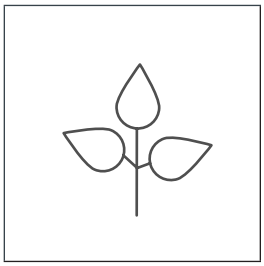
bush bean
spinach
beet
turnip
kohlrabi
leeks
onion
garlic

- **2 plants per square foot**



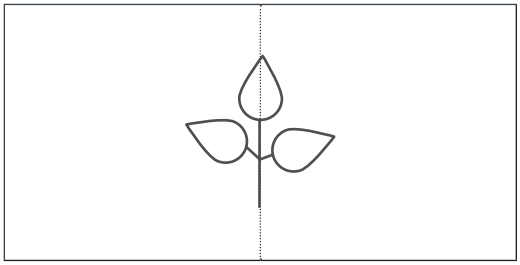
cucumber
sweetpotato
kale

- **1 plant per square foot**



tomato
eggplant
pepper
potato
broccoli
cauliflower
cabbage
celery
okra
asparagus
sunflower
most herbs

- **1 plant per 2 square feet**



summer squash
zucchini
winter squash
pumpkin
canteloupe
watermelon

FIGURE 5-4 The school garden might be the first time a student has the opportunity to plant a seed.

Grade Level: K-5

Subject Area: Math / Science

Standards:

K.L.1.2; K.CC.5

1.L.1.1,2; 1.OA.1; 1.MD.2; 1.G.3

2.L.2; 2.OA.1,3; 2.MD.2,3; 2.G.2

3.L.2.1,2,3; 3.OA.1,2,3; 3.NF.1; 3.MD.4,5,6; 3.G.2

4.L.2.1,2; 4.NF.1,2; 4.MD.3; 4.G.1,3

5.L.2.2,3; 5.L.3.2; 5.G.1,2

EXTENSION | CURRICULUM IDEAS

Kindergarten

- Are seeds living or non-living?
- Count the number of each type of seeds
- Count the number of squares

First Grade

- Investigate why plants need space, why do different types of plants have different space needs?
- What do plants need to survive and grow?
- Measure plant spacing with non-standard units.
- Addition and subtraction with seeds
- Partition rectangles into halves and fourths

Second Grade

- Compare families of seeds for similarities and differences
- Addition and subtraction with seeds
- Determine odd and even amounts
- Estimate lengths
- Partition rectangles into rows and columns
- Do seeds resemble their parent plant, or do seeds of similar fruits (ex. citrus) resemble each other?
- What will we need for these seeds to germinate and grow?
- Will a large seed grow a larger plant than a small seed?
- How much space does each seed need?

Third Grade

- How do environmental conditions determine how well plants survive and grow?
- Stages of the plant life cycle
- Interpret products of whole numbers
- Fractions
- Generate measurement data
- Area
- Partition shapes into parts with equal areas, express each unit as a unit fraction of the whole

Fourth Grade

- What nutrients are found in each plant grown and how do they contribute to our health?
- Fractions
- Area and perimeter
- Parallel and perpendicular lines
- Lines of symmetry

Fifth Grade

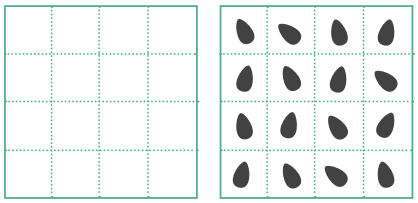
- What role does this organism play in the garden ecosytem?
- Examine the interconnectedness of relationships
- Compare within and across families of seeds to determine inherited traits
- Use the grid to learn about the coordinate plane

ACKNOWLEDGEMENTS

Adapted from Junior Master Gardener “Paper Towel Gardening”

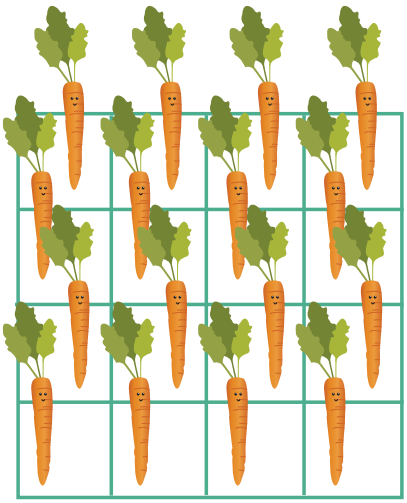
SQUARE FOOT GARDENING GUIDE

Use the guide below to figure out the spacing for your plants!

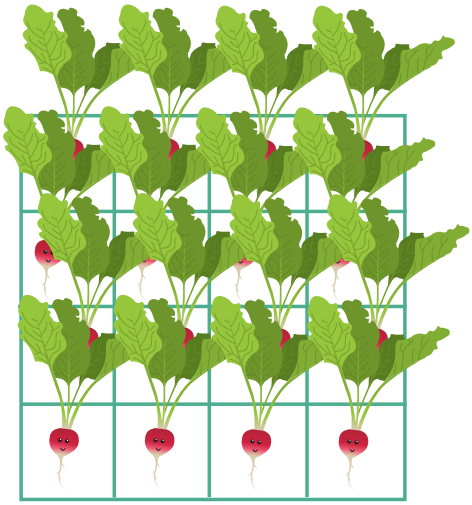


3”spacing between plants = 16 plants per square foot

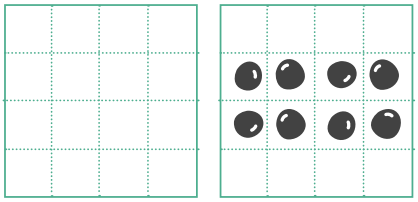
- carrots
- radishes
- green onions
- chives



Carrots

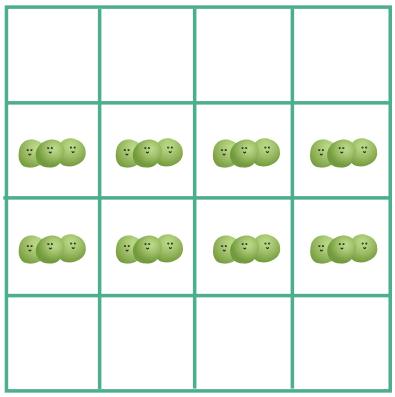


Radish

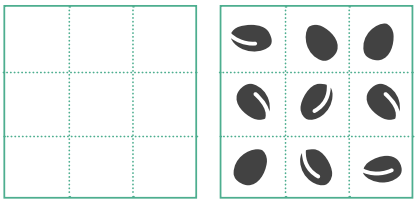


3”spacing between plants on a trellis = 8 plants per square foot

- peas
- pole beans

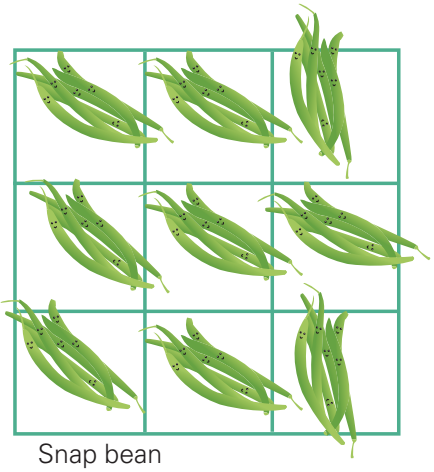


Peas

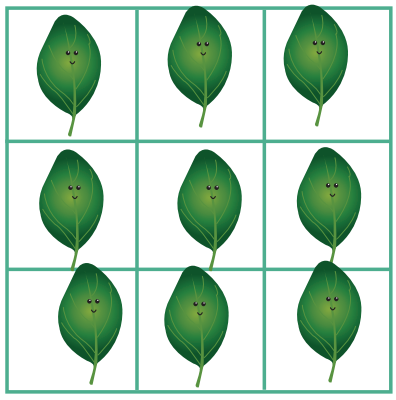


4”spacing between plants = 9 plants per square foot

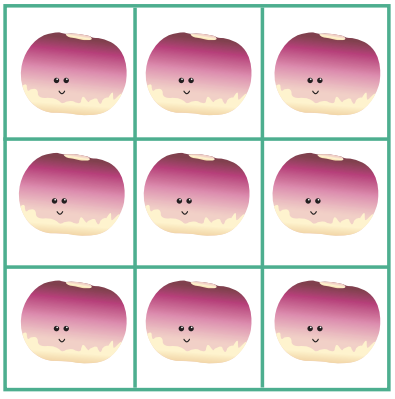
- snap beans
- spinach
- beets, turnips, kohlrabi
- leeks, onions, garlic, scallions



Snap bean



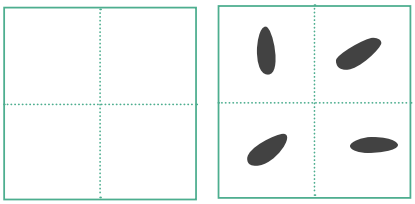
Spinach



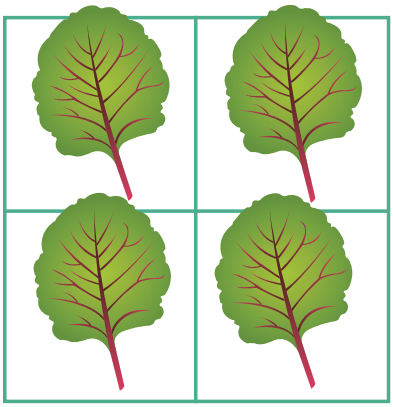
Turnip

SQUARE FOOT GARDENING GUIDE

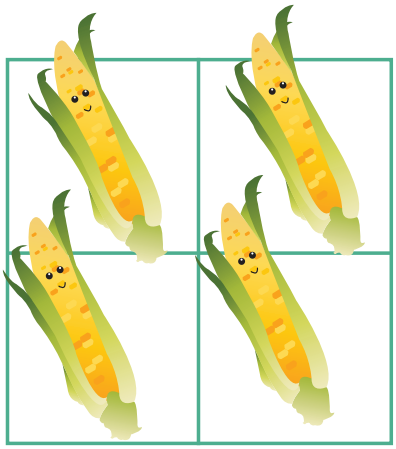
Use the guide below to figure out the spacing for your plants!



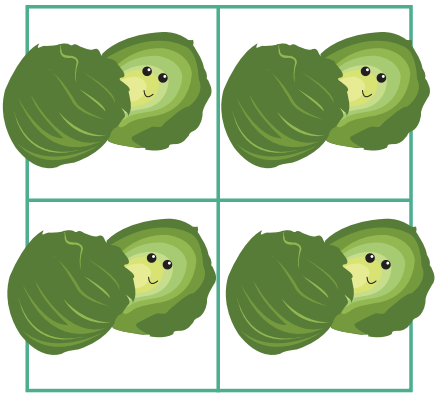
- 6”spacing between plants = 4 plants per square foot
- lettuce
- swiss chard
- corn
- parsley, parsnips



Turnip

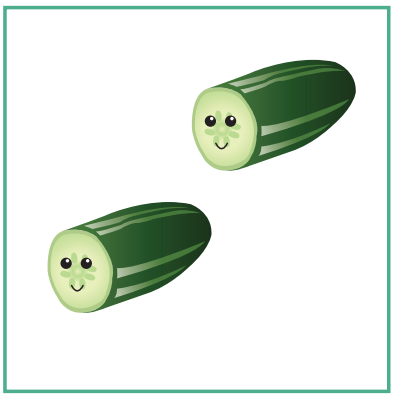


Corn

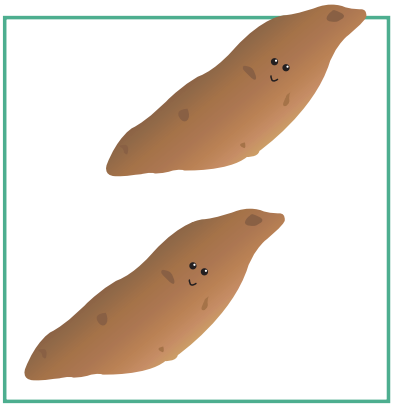


Lettuce

- 8”spacing between plants = 2 plants per square foot
- cucumbers (on trellis)
- sweetpotatoes
- kale



Cucumbers



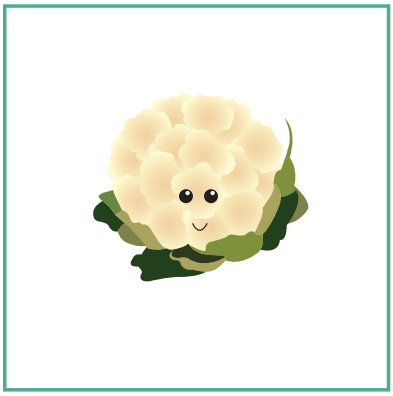
Sweetpotato

Kale

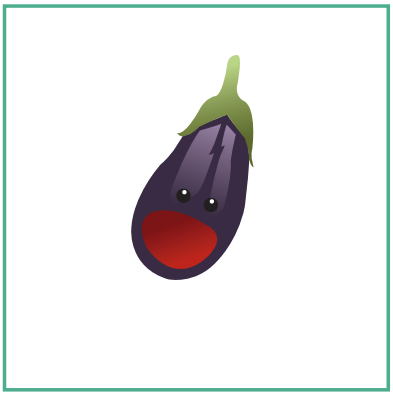
SQUARE FOOT GARDENING GUIDE

Use the guide below to figure out the spacing for your plants!

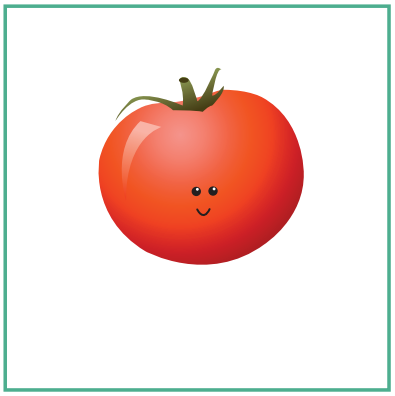
- 12”spacing between plants = 1 plant per square foot
- tomatoes, eggplant, peppers, potatoes
- celery, asparagus, okra
- cauliflower, broccoli, cabbage
- sunflowers



Cauliflower

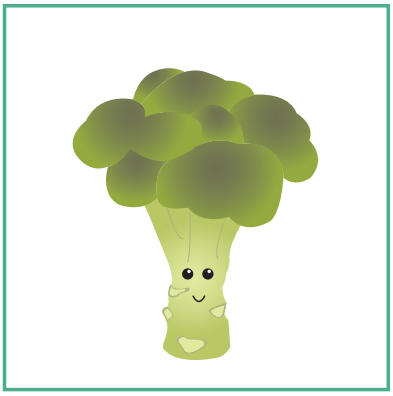


Eggplant

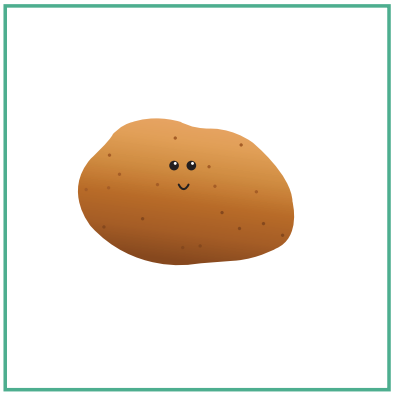


Tomato

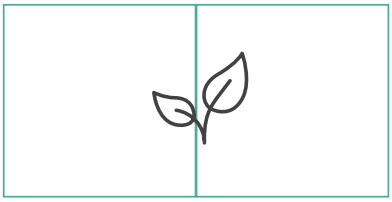
Okra



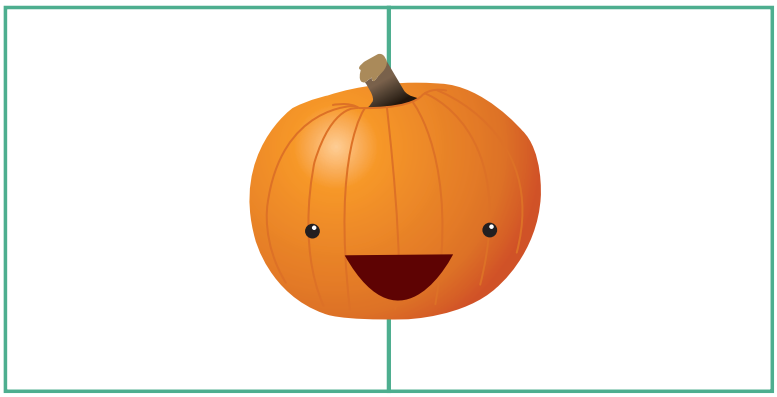
Broccoli



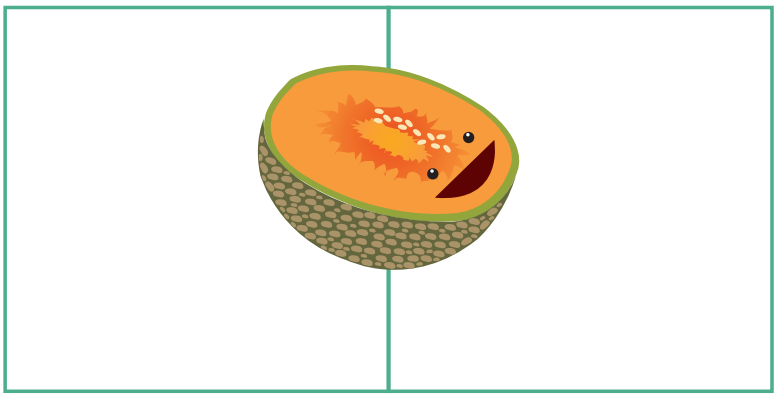
Potato



- 18-24”spacing between plants = 1 plants per 2 square feet
- summer squash, zucchini
- winter squash, pumpkins
- melons



Pumpkin



Melon