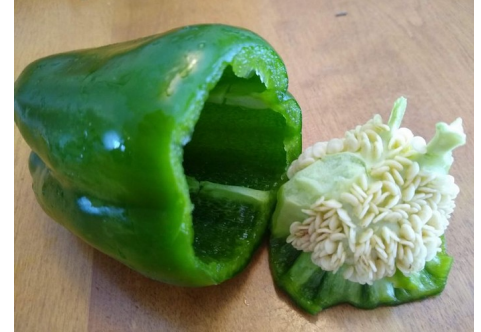


Vegetables Take Over the World

Overview: In this fun math lesson, students use their addition and multiplication skills to answer the question “could vegetables take over the world?” Students count the many seeds in sweet peppers, or other vegetables with many seeds such as cucumbers, squash, or tomatoes. Then they must determine the number of plants that would grow from future seeds. In two years? How about three, four, or five years? The lesson can be modified for many grade levels.



Objectives: The student will be able to:

- Count the seeds in a vegetable with numerous seeds
- Calculate the number of plants that would grow in each subsequent year if every seed grew into a plant.
- Determine the total number of plants in subsequent years.
- Graph results of seeded count and vegetable taste test

Grades: 2-5 (*Younger grades can count seeds and use addition skills to calculate the number of plants in one or two years. Older grades can use multiplication and numerical expressions for this calculation and extend the count for more years.*)

Materials:

one paring knife

A vegetable with many seeds for each group of three or four students such as:

- sweet peppers
- zucchini
- yellow squash
- cucumbers
- tomatoes

Depending on the vegetables you have available, each group could use a different vegetable, or every group could use the same vegetable. If each group uses the same vegetable, you could have students take the average number of seeds from all the vegetables and use that number for future calculations.

Newspaper or paper towels to cover workspace

Optional: a copy of the *Vegetables Take Over the World Worksheet* (at the end of the lesson) for each student

INTRODUCTION:

Begin by asking which part of the plant contains the seeds – the fruit. Ask students which vegetables they eat have seeds inside. Make a list of the responses. Ask students how can a vegetable also be a fruit? Explain that in botany, the scientific study of plants, a fruit is the part of any plant that contains the seeds. When we talk about food we eat, however, we call something sweet a fruit and something that is not sweet a vegetable. For the purpose of this lesson, we will be counting the seeds in fruits that are vegetables.

Ask students how many seeds are in one of the vegetables on their list. Do all the vegetables on the list have the same number of seeds? Why do they think vegetables would have different numbers of seeds? Ask why they think a plant would make many seeds?

Explain that different plants have different strategies when making seeds. Some plants pack as many seeds as possible into each fruit to make sure that at least some will grow into new plants. Other plants, like the avocado, put all of their resources into producing and protecting one very large seed.

Procedure:

Teacher starts the lesson by telling students, “Today we are going to discover whether vegetables can take over the world.” Ask students if they know how many seeds are in the vegetables on the list they made of vegetables that contain seeds. Are there many or are there a few? Tell them they are going to count the seeds in one vegetable.

Teacher divides the class into groups of three or four students. Place a vegetable in the middle of each group. Tell the students you are going to cut the vegetable in half, but before you do, they must estimate how many seeds will be inside. Ask the groups to discuss how many seeds might be inside. Then each child should then write down his/her own estimate.

When a group has finished estimating, the teacher will cut its vegetable in half. Cucumbers and squash should be cut lengthwise. Tomatoes and peppers should be cut from the top (stem) down.

Before they begin to count, ask each group to decide how they will divide the task of counting up among the members, and how they will arrive at a final count.

When each group has a final tally of seeds:

- Ask each group if each seed grew into a plant next year, how many vegetable plants would there be?
- If each plant grew one vegetable with the same number of seeds, how many seed would there be after one year?

As a group, students should discuss how to do this before they make the calculation.

Remember you are assuming that only one vegetable with the same number of seeds grows on each plant in each subsequent year. Explain to students that in nature, each plant would not grow the same number of vegetables, nor would the vegetables all have the same number of seeds.

Optional: After counting the seeds in one vegetable in small groups, older students can take the average of seeds in the vegetables of all the groups before they calculate the number of plants in future years.

Students graph the results of their seed count and the number of vegetable plants and/or seeds that could grow in subsequent years.

Evaluation:

Completed Vegetables Take Over the World worksheet
Completed graph of seed count

Extensions:

If each group uses a different vegetable, when the lesson is completed, conduct a taste test with the students, asking them to select the vegetable they like best. The class can then graph the results of the taste test. Older students can rank the vegetables from one to five according to students preferences.

Ask students in small groups to brainstorm what would happen if vegetables took over the world – would the results be favorable or not? Then ask students individually to write a short story of a few paragraphs imagining if this happened.

How likely is it that every seed in a vegetable will grow into a plant? Do an experiment to find out. Give each group a packet of seeds for their vegetable, or if every group used the same vegetable, divide seeds from one packet among each group. Ask each group to plant the seeds. Egg cartons with holes punched in each cell for drainage work well. The students observe how many seeds germinate. This is the germination rate. They can graph the results of their experiment.

Students research the vegetable they used for this lesson to learn how many vegetables actually grow on average on one plant.

New Jersey Learning Standards

Math2:OA.A,B,C, 2.NBT.A,B 3.OA.A,B,C, 3.NBT.A 3.MD.B 4.OA.A,C, 4.NBT.A,B
5.OA,B 5.NBT.A.1,2,5

NAME _____

Vegetables Take Over the World Worksheet

My group's vegetable is a _____.

I estimate there are _____ seeds inside.

We discovered _____ seeds inside our vegetable.

My estimate was _____ more or less than the actual number.
Circle more or less.

Each seed grows into a plant that has one vegetable with the same number of seeds you counted.

In one year

How many plants would there be? _____

How many seeds? _____

In two years

How many plants would there be? _____

How many seeds? _____

If each of these seeds were planted and grew into a plant with one vegetable with the same amount of seeds:

in 3 years, how many plants? _____ how many seeds? _____

in 4 years, how many plants? _____ how many seeds? _____

in 5 years, how many plants? _____ how many seeds? _____