4 Seasonal Gardening: Melons

Part 1

Health Standards Addressed

Kindergarten: 1.1.N Name a variety of healthy foods and explain why they are necessary for good health.

1.2.N Identify a variety of healthy snacks.

7.1.N Select nutritious snacks.

First Grade: 1.3.G Identify a variety of behaviors that promote healthy growth and development.

Second Grade: 1.1.N Name a variety of healthy foods and explain why they are necessary for good health.

1.2.N Identify a variety of healthy snacks.

7.4.N Examine the criteria for choosing a nutritious snack.

Third Grade: 5.1.G Examine why a variety of behaviors promote healthy growth and development.

Fourth Grade: 1.1.N Identify and define key nutrients and their functions.

7.1.N Practice how to take personal responsibility for eating healthy foods.

Fifth Grade: 1.6.N Differentiate between more-nutritious and less-nutritious beverages and snacks.

5.1.N Use a decision-making process to identify healthy foods for meals and snacks.

7.1.N Identify ways to choose healthy snacks based on current research-based guidelines.

8.1.N Encourage and promote healthy eating and increased physical activity opportunities at school and in the community.

CCSS Math Standards Addressed

SMP 1: Make sense of problems and persevere in solving them.

SMP 2: Reason abstractly and quantitatively.

SMP 3: Construct viable arguments and critique the reasoning of others.

SMP 4: Model with mathematics.

SMP 6: Attend to precision.

Materials

Melon from Harvest of the Month (uncut), knife, paper towels or other receptacle to hold an amount of seeds (one paper tower or small cup for each pair of students.) student copies of Seedless Watermelon article (optional)

Success Skills

- **Collaboration** with their peers during their discussion of food and food choices.
- **Communication** of ideas with peers as students discuss the topic.
- **Creativity** as students illustrate and write about what they have learned about food and food choices.

Challenging Question

Why is Fruit a part of the Seed to Table Cycle?

(K–5) Grade Access Prior Knowledge

- Remind students that food (vegetables and fruits) are grown and harvested.
- Have students talk about fruit and what defines a fruit.

Explore

Kindergarten and First Grade Explore

In this lesson, students understand that fruit contains seeds that can grow more fruit. They will also estimate the number of seeds in the fruit, and count the seeds to get an exact amount.

Explain: We talked in the previous lesson about what makes a fruit.

Observe: Look at this melon. (Hold up the melon.)

Ask: How many seeds do you think are in this melon?

- Have students talk to their partners about how many seeds they think are in the melon. (If you have a cantaloupe or honeydew melon, proceed with estimating the number of seeds. If you have a watermelon, talk with students about the idea of "seedless" fruit, and then do your estimate.)
- Cut the watermelon.

Explain: Most people eat melon ***raw.*** ***Raw*** means not cooked.

- If students are eating watermelon, direct them to save the seeds. If students are eating another melon (honeydew, cantaloupe, etc.) scoop out the seeds and save them to count after students have eaten their fruit.
- Put an amount of seeds on a paper towel or small cup. Have students work in pairs to count the seeds. Have students group seeds in tens.
- Count by tens to find the amount of seed in the fruit. Write the total amount of seeds on the board.

Kindergarten and First Grade Revision and Reflection

In their response journals, have students draw a picture of the outside (what it looked like before it was cut) and inside of the fruit. Have students respond to this prompt. How many seeds were inside the fruit?

Write the sentence: Our _____ (type of melon) had _____seeds. Teachers can use a highlighter to write the words for students or students may write independently.

Second and Third Grade Explore

In this lesson, students understand that fruit contains seeds that can grow more fruit. They will also estimate the number of seeds in the fruit, and count the seeds to get an exact amount.

Explain: We talked in the previous lesson about what makes a fruit.

Observe: Look at this melon. (Hold up the melon.)

Ask: How many seeds do you think are in this melon?

- Have students talk at their table about how many seeds they think are in the melon. (If you have a cantaloupe or honeydew melon, proceed with estimating the number of seeds. If you have a watermelon, talk with students about the idea of "seedless" fruit, and then do your estimate.)
- Each table needs to come to a consensus about the estimation they wan tot report.
- Chart each table's estimation of seeds in the fruit.
- Cut the watermelon.

Explain: Most people eat melon ***raw. Raw*** means not cooked.

- If students are eating watermelon, direct them to save the seeds. If students are eating another type of melon (honeydew, cantaloupe, etc.) scoop out the seeds and save them to count after students have eaten their fruit.
- Put an amount of seeds on a paper towel or small cup. Have students work in pairs to count the seeds. Have students group seeds in tens.
- Count by tens to find the amount of seed in the fruit. Write the total amount of seeds on the board. Compare that amount of seeds with class estimation.

Ask: Whose estimation was closest? Were there any estimations that were unreasonable?

Teacher note: Most honeydew melons average more than 200 seeds.

Second and Third Grade Revision and Reflection

Students respond to the following questions in their journals:

- How did your group come up with an estimation for the number of seeds in the melon?
- Why do you think melons have so many seeds?

Fourth and Fifth Grade Explore

In this lesson, students understand that fruit contains seeds that can grow more fruit. They will also estimate the number of seeds in the fruit, and count the seeds to get an exact amount.

Explain: We talked in the previous lesson about what makes a fruit.

Observe: Look at this melon. (Hold up the melon.) Ask: How many seeds do you think are in this melon?

- Have students talk at their table about how many seeds they think are in the melon. (If you have a cantaloupe or honeydew melon, proceed with estimating the number of seeds. If you have a watermelon, talk with students about the idea of "seedless" fruit, and then do your estimate.)
- Each table needs to come to a consensus about the estimation they wan tot report.
- Chart each table's estimation of seeds in the fruit.
- Cut the watermelon.

Explain: Most people eat melon raw. Raw means not cooked.

- If students are eating watermelon, direct them to save the seeds. If students are eating another type of melon (honeydew, cantaloupe, etc.) scoop out the seeds and save them to count after students have eaten their fruit.
- Put an amount of seeds on a paper towel or small cup. Have students work in pairs to count the seeds. Have students group seeds in tens.
- Count by tens to find the amount of seed in the fruit. Write the total amount of seeds on the board. Compare that amount of seeds with class estimation.

Ask: Whose estimation was closest? Were there any estimations that were unreasonable?

Teacher note: Most honeydew melons average more than 200 seeds.

Fourth and Fifth Grade Revision and Reflection

Students respond to the following questions in their journals:

- How did your group come up with an estimation for the number of seeds in the melon?
- Why do you think melons have so many seeds?
- Why do we have "seedless" varieties of watermelon? How does that alter the Seed to Table Cycle?

Watermelons

Commercial production of seedless watermelon began in the 1990s. Since then it has steadily increased to be a major part of today's watermelon market. Early seedless varieties did not have the sugar and flavor levels of seeded types, but plant breeders have improved these traits and new varieties no longer have these problems.

However, one problem that does continue is seed germination. Initially, seed germination of seedless watermelon was quite low. One solution is to keep seed warm (90°F) until it germinates and emerges from the planting media. Still, this is difficult in cool climates where well water can have temperatures in the 40°F range. Each time the seeds are watered it lowers their temperature.

On a small scale, warm temperatures can be maintained by watering transplant flats, covering them and letting them heat up in the sun in the greenhouse for a day or more. Then, plant the seed and cover them again until seedlings emerge. On a large scale, they can be placed in dark rooms heated to 90°F with 95 percent relative humidity and held until seedlings emerge. Either process will take four to five days. After emergence, seedlings are then finished off in the greenhouse for three weeks and then transplanted to the field late May or early June. Following these steps generally produces a more than 90 percent germination rate. High germination rate is important since seed of seedless types is quite expensive compared to seeded varieties.

The standard number of chromosomes in watermelon is 22. This is called the diploid number (di meaning two, as in dissect – cut in two). With this even number, cell division is highly regular and produces pollen and egg cells with 11 chromosomes that recombine to produce seed with the usual 22 chromosomes. Through a chemical process, the chromosome number can be doubled from 22 to 44 (tetraploid, tetra meaning four). Cell division in plants with 44 chromosomes is, again, highly regular and will produce pollen and egg cells with 22 chromosomes that recombine to produce seed having 44 chromosomes. However, if pollen from a plant with 22 chromosomes is placed on a female flower of a plant with 44 chromosomes, the resulting seed will have 33 chromosomes (triploid – three sets of the base number of 11 chromosomes). This odd number does not produce (or rarely produces) viable pollen and eggs in the resulting seedlings.

Seedless watermelon fruit will have white seed traces, but only occasionally will it have a mature, brown, hard seed. Since the pollen of these plants is not viable, a diploid, seeded watermelon needs to be planted along with the seedless variety. The diploid will provide good pollen for the bees to move around and pollinate the flowers of the seedless variety. Viable pollen is needed to stimulate fruit set and growth, even though the resulting fruit will be seedless. These diploid varieties can be commercial, seeded types or simply be there as a pollen source.

Seed companies maintain diploid and tetraploid parental lines and then perform controlled crosses by hand pollination to produce seed. These additional expenses in seed production are what cause seed for seedless types to be more expensive.

More watermelon information can be found at the National Watermelon Promotion Board website.

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