

Key Message:

Taste a tomato, crunch a carrot, or savor a sweet potato. With their bright colors and flavorful tastes, they'll steal the show!

Subject Connections:

Math, English Language Arts, Health

Learning Objectives:

Students will be able to...

- Identify and choose appropriate units for liquid and dry food ingredients.
- Demonstrate an understanding of unit relationships (proportion) and fractions.
- Explain the amount of fruits and vegetables 5th and 6th graders need each day.
- Convert measurements and make calculations between units of volume and mass.

Supplies:

- Access to sink with warm, running water and soap
- **Garden Journals**
- Student handouts (pp. 82-84):
 1. **Kitchen Measurement**
 2. **Chef Challenge**
- **Dig In!** poster – **Veggie Rock Stars**

Additional Supplies and Preparation:

See full instructions to the right.

Featured Fruits and Vegetables:

Carrot, Tomato, and Sweet Potato (baked)

Cut up and provide enough samples of raw carrots and tomatoes for students to try in the tasting activity on pp. 49-50, and enough to prepare the recipe on p. 84. Bake slices of sweet potatoes (discuss with school food service) or prepare a second variety of raw tomato. Provide water (and cups) for students to drink as they taste the vegetables.

Lesson 7: Chef Challenge

TOTAL TIME REQUIRED: 185 minutes / 3 sessions

Session 1: Getting Started 30 min (Math);

Activity I “Kitchen Measurements”
40 min (Math)

Session 2: Activity II “Taste Your Colors”

40 min (English Language Arts)

Session 3: Activity III “Chef Challenge”

60 min (Health);

Reflect 15 min

LESSON OVERVIEW:

In this lesson, students will work with kitchen measurements, conversions, and calculations. They will use their math knowledge to prepare a recipe with red and orange vegetables. Students will discuss the recommended amount of fruits and vegetables kids need each day and explore physical activity in the garden.

ESSENTIAL QUESTIONS: *What tools or equipment do we use to measure liquids and solids? What units are used? How do we make conversions between units? How many fruits and vegetables do I need each day?*

ADDITIONAL SUPPLIES AND PREPARATION:

For Measurement Exercise (for every four to five students)

Dry beans, water (provide 2.5 cups per station), liquid and dry measuring cups, measuring spoons, a clear beverage cup with at least an 8-oz capacity, a plate, and a bowl. A variety of food and beverage containers (for example, dry ingredients – dry beans, canned vegetables, bag of rice; liquid ingredients – can of tomato sauce, bottled water, vegetable oil). Foods for measuring (optional): bag of baby carrots, bag of salad greens, strawberries, sample school lunch portions.

Equipment Needed for Recipe

Can opener, plates, forks, napkins, plastic gloves, and aprons (for each student)

Additional Ingredients for Rainbow Pasta Veggie Salad

Recipe on p. 84 serves 4; adjust as needed: cooked whole-grain spiral (rotini) pasta (rinsed and drained), a variety of rinsed vegetables (for example, chopped carrots, broccoli florets, green peas, chopped tomatoes, seeded and diced red or orange bell peppers, canned low-sodium chickpeas), light Italian-style dressing (olive oil and lemon juice can be used instead), salt and pepper. Optional: low-fat shredded mozzarella cheese, chopped cooked chicken.

TEACHING PROCEDURE:

GETTING STARTED (30 minutes, Math)

1. Explain that **MyPlate** provides information on how much people need to eat each day from each food group to be healthy and, for kids, to grow. Explain that the amounts of each food group people need each day depends on their height, weight, gender, age, and physical activity level. Ask: *How do you think your activity level affects the amount of food you need? How might it compare for athletes and nonathletes?*

Explain that people who are more active need more nutrients than people who are not active at all. Share with the class that most moderately active 5th- and 6th-grade students need **1½ cups of fruit** and **2½ cups of vegetables** each day. *Does that sound like a lot or a little?* Explain that an active 11-year-old girl or boy who gets more than 60 minutes of physical activity each day needs more: 2 cups of fruit and 3 cups of vegetables.

- How much is a “cup” of vegetables? What does 1 cup of fruit look like? Show students the following measurements by using dry beans and water. Place the beans on a plate after measuring and the liquid in a clear beverage cup. Explain what counts as a cup of fruits and vegetables according to **MyPlate**.
 - 1 cup vegetables** = 1 cup of most raw or cooked vegetables or vegetable juice. Two cups of raw leafy greens counts as 1 cup of vegetables.
 - 1 cup fruit** = 1 cup of fruit or 100% fruit juice. A half-cup of dried fruit counts as 1 cup of fruit.
- Sometimes it’s hard to know how much a portion is just by looking at it. Give students a better understanding by providing a variety of dry and liquid ingredients to measure. Divide the class into groups of four to five students per measuring station. Identify the equipment at each station: dry and liquid measuring cups, a set of measuring spoons, scale, plate, bowl, and dry and liquid ingredients (e.g., beans, water).

If possible, have students investigate the following (you may also try measuring portions from that day’s school lunch, with assistance from school food service):

- How many baby carrots equal 1 cup? (*About 12*)
- How many cups of salad are in the portion you normally would serve yourself? (*Answers will vary; remember that 2 cups of salad greens are equivalent to 1 cup of vegetables from the **Vegetable Group**.*)
- How many large strawberries equal 1 cup? (*About eight*)

How many cups of vegetables are in a portion served for school lunch? Of fruit? Encourage students to relate the way 1-cup and ½-cup portions look on a plate to the size of common objects. (For example, 1 cup of vegetables might appear like the size of a baseball.)

- Ask students: *What are some ways you could eat 1½ cups of fruit during the day? How could you split this amount up into smaller portions at meals and snacks? (For example, ½ cup at breakfast, ½ cup at lunch, and ½ cup as an after-school snack.) What portion size of vegetables would you need to eat at meals and snacks to total up to 2 ½ cups for the whole day?* Remind students that one easy way to help ensure that they are getting enough is to **make half their plate fruits and vegetables** at meals. Explain that the **MyPlate** icon serves as a visual reminder to eat more fruits and vegetables at meals.
- Ask students to think about why a person might need to use math and measurements when choosing which foods to eat or when preparing a meal in the kitchen. Ask if they have baked or cooked anything. Why is accurate measuring important? Invite students to share their ideas. Explain that proper measurement of ingredients ensures that a recipe comes out correctly. (For example, when baking bread, the correct amount of ingredients will make the bread dough rise and taste right.)



DIG DEEPER! MORE MATH IN THE KITCHEN (MATH)

Have students look up the amount of sodium and saturated fat in fruits and vegetables and compare it to amounts in salty snacks, such as chips. Use USDA’s SuperTracker Food-a-Pedia to look up the nutritional content of various snacks:

<http://www.choosemyplate.gov/foodapedia>.

CALCULATIONS IN THE GARDEN (MATH)

Extend your students’ practice and understanding of measurements and volume into the garden. There are many ways to measure, collect, graph, and analyze data, including:

Track the growth rates of various plants. Measure how the plants grow week by week.

Record the temperature of the air and soil in fahrenheit and centigrade.

Measure the rainfall each week to determine the watering schedule.



Calculate the amount of fertilizer needed per quart and per liter of water.

ANSWER KEY: KITCHEN MEASUREMENT HANDOUT

- Answers will vary – but 1 cup is roughly the size of a baseball.
- Once in a mixing bowl, a dry cup may look different (more than a liquid cup) because dry ingredients take up more space.
- 1.5 cups fruit/day = 360 mL (1.5 x 240)
2.5 cups vegetables/day = 600 mL (2.5 x 240)
- 15.5-oz can of beans = 1.9 cups of beans with liquid (15.5 / 8)
- 8-oz of cooked pasta = 1 cup cooked pasta
- 1.5 cups fruit = 24 Tbsp (1.5 x 16)
- 2.5 cups = 20-oz (2.5 x 8)
- 32-oz = 2 lb (16 x 2)
- Answers will vary according to package.
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LEARNING ACTIVITIES

Activity I. Kitchen Measurements (40 minutes, Math)

Prepare: Display a variety of food and beverage containers with labels for students to study. (For example, dry ingredients – dry beans, canned vegetables, bag of rice; liquid ingredients – can of tomato sauce, bottled water, and vegetable oil.)

- Write the following measurement abbreviations on the board: **mL, g, oz, Tbsp**. Do your students know what the abbreviations stand for? (*This step will help you assess prior knowledge.*) Next, write “**volume**” and “**weight**” on the board. Invite students to try to define each before you explain (see sidebar).
- Distribute the **Kitchen Measurement** handout (pp. 82-83). Review the measurement abbreviations and discuss the differences and relationships between the U.S. (a.k.a. standard) and metric system.
- Have students work in pairs to study the food and beverage containers provided. Do food packages include any units of measurement? Have them write down in their **Garden Journals** any units of measurement they find, and categorize them by **volume** or **weight**.

Show how they can find measurements in at least two places: on the front of the package/container (*the Net Weight [Net Wt.] of the entire contents in ounces and grams*); on the back or side of package/container (**Nutrition Facts label**). Ask them to notice any differences between the units of measurement of liquid and dry ingredients (see sidebar).

- Explain that we look at the **Net Weight** of a food product when calculating the ingredients needed in a recipe. For instance, a recipe may call for 16 ounces of pasta or require a 15.5-ounce can of beans.
- Sometimes, a recipe will use different measurement units. Conversions to another unit (for example, cups to milliliters) can be made by multiplying or dividing measurements. Ask students to first measure out 1 cup of liquid, then identify how many milliliters it is (*240 mL*). Next, give students 20 minutes to measure the liquid and dry ingredients and complete the math problems on their handout using the measurement and conversion chart.
- As a review, ask students to demonstrate their understanding of this lesson by asking: *What is the difference between weight and volume? (Weight measures the heaviness of an object, and volume measures how much a container can hold or how much space an ingredient occupies.)* Hold up several packages or cans of food used in the lesson, one at a time. Ask: *What is the weight of this food? What is the volume of this food?*

The Nutrition Facts label: Point out the **Nutrition Facts label** and have students note the serving size and servings per package. Explain that people use this information to make healthy choices about food. The nutrition information on the label is for one serving of the food item. But the whole package of the food may contain more than one serving. (For example, a box of crackers might contain 30 crackers, but the “serving size” on the Nutrition Facts label is for only five crackers.) Explain that if people eat more than the serving size listed on the Nutrition Facts label, they are getting more of each nutrient listed on the label, which can include saturated fat and sodium (salt). So, if they eat two servings, they will be eating double the amount of saturated fat and salt listed on the label.

Sodium: While our bodies need sodium, too much is not good. Sodium (or salt) is added to foods for flavor and to preserve it. It’s found in many processed foods such as chips, canned soups, lunch meats, and hot dogs.


Saturated Fats: These are types of solid fats that are solid at room temperature. They are found in foods such as hot dogs, bacon, regular cheese, whole milk, cakes, cookies, and other baked goods. Eating too much solid fat is not good for our hearts.

Activity II. Taste Your Colors (40 minutes, English Language Arts)

Prepare: Rinse tomatoes, carrots, and sweet potatoes under cool, running water. Scrub carrots and sweet potatoes with a vegetable scrub brush. Peel the carrots and cut them up into sticks. Cut the tomatoes into small wedges or slices. Peel and slice a sweet potato into thin slices, then bake (if possible, ask for assistance from a local chef or school food service staff). If you cannot bake sweet potatoes to sample, provide two varieties of tomatoes to do a taste comparison (for example, a grape tomato versus a Roma tomato). Provide enough samples for each student on plates, along with forks and napkins. Provide drinking water in cups for students to sip between tastings.

1. First, have students follow hand-washing procedures (see p. 5). Then, provide each student with samples of carrots, tomatoes, and sweet potatoes. Students should note the color, texture, and taste of each sample and record their observations in their **Garden Journals**. Before they begin tasting, remind them of the class **Tasting Etiquette Guidelines** (established in Lesson 1) and brainstorm appropriate vocabulary (descriptive adjectives) that will help them with their observations. (For example: crunchy, sweet, soft, creamy, hard, tangy, and tender). Have them divide a page, as shown below, using different columns to organize their notes. Encourage them to close their eyes and chew slowly to savor and observe the taste of each red and orange vegetable.

CARROT	Appearance	Texture	Flavor
TOMATO	Appearance	Texture	Flavor
SWEET POTATO	Appearance	Texture	Flavor

 **Teacher Tip!** Display the poster **Veggie Rock Stars** in a visible location in the classroom. Challenge students to identify the red and orange vegetables in the poster. How many have they tried? Can they identify any dark-green vegetables in this poster?

(**Note:** A list of all vegetables pictured in the poster can be found at: http://teamnutrition.usda.gov/Resources/dig_in.html)

VOLUME

is the amount of three-dimensional space something occupies, or the amount an object can hold. Volume is measured in the following units:

Metric:

Teaspoon (tsp)
Tablespoon (Tbsp)
Cubic Centimeters/
Cubic Meters (cc/cm)
Milliliter (mL)
Liter (L)

U.S.:

Fluid Ounce (fl oz)
Pint (pt)
Quart (qt)
Gallon (gal)
Cup
Bushel

WEIGHT

is the heaviness, or downward force on an object caused by gravity. Weight is measured in the following units:

Metric:

Grams (g)
Kilograms (kg)
Tonnes

U.S.:

Ounces (oz)
Pounds (lb)
Tons



IMPORTANT FOOD SAFETY STEPS!

Please see p. 4 for a reproducible handout to post in a visible location in your classroom. It is important that you follow these steps to keep yourself, your students, and any parents or volunteers safe and healthy.

Hand Washing:

All persons participating in the food preparation activity (teachers, students, volunteers, parents) should wash hands before and after preparing, handling, or sampling foods.

Recipe

COOKING PASTA FOR RAINBOW VEGGIE PASTA SALAD

Prepare pasta according to package directions. Different types of pasta yield different amounts.



2. Ask students to share their observations. Have students share a meal or snack they have had that has at least one of the featured vegetables: **carrot, tomato, sweet potato**. Make a list on the board. Collaborate on additional ideas. Discuss preparation. (For example, can it be baked? Eaten raw? What goes well with it?)

Activity III. Chef Challenge (60 minutes, Health)



***Allergy Alert!** See p. 2 for more information on food safety and allergies before starting this food preparation activity.

Prepare: Read through the **Chef Challenge** handout (p.84) and assemble the supplies and ingredients needed for the **Rainbow Veggie Pasta Salad** recipe your class will prepare, working in groups of four students. Cook, drain, and chill enough pasta in advance (see sidebar), and have an assortment of colorful vegetables chopped up ahead of time. As an additional option, provide chopped grilled chicken and low-fat shredded cheese. Ask food service staff or parents for assistance.

1. Divide the class into groups of four to five students. Distribute the **Chef Challenge** handout (p.84) with a recipe for **Rainbow Veggie Pasta Salad**. Explain that students will work in teams to prepare the recipe featuring colorful fruits and vegetables of their choosing. Have students read through all the instructions, and assess their stations to make sure they have what they need. Have students discuss what colorful vegetables they want to include.
2. Explain that they will first need to note and adjust the yield of the recipe to the number of students in their group, according to whether they are cooking for the entire class or cooking for a smaller group of students. They will need to also adapt the measurements of the ingredients. They should write down their new measurements on the handout.
3. Review the food safety and preparation steps carefully with students before cooking begins (see pp. 4-5). After they have washed their hands and put on aprons and plastic gloves, have them begin the preparation of their recipe. Arranging the ingredients in an assembly line will make the process easier and allow everyone in the group to participate.

4. When they finish preparing their salad, have students clean up their stations, throw away waste or compost the food scraps in the school garden's compost bin, and wash the dishes and all surfaces (including utensils and appliances) carefully with hot, soapy water.

Note: *If refrigeration is possible, cover and set aside the completed recipes to taste later. If not, save cleanup for after the next step.*

5. Celebrate by sharing and eating the prepared pasta salad recipes together as a class. Have students wash their hands before eating. Provide each student with a plate and fork and a small sample of each dish. Have students write down, either in their **Garden Journals** or on index cards, their thoughts about each recipe dish using the following questions:


Recipe:

- Featured red and orange vegetable:
- Additional vegetables:

Taste:

- What do you like about this recipe?
- Do you have an idea of how it could be improved?

Ask students to share their thoughts with the class. Encourage students to say one compliment about each dish, starting with the phrase, "My compliments to the chef! Your dish was...."

 **Note:** *Make sure to document the process and the final presentations – this activity will guarantee some great photos!*

REFLECT (15 minutes)

Ask students to reflect in their **Garden Journals** on the following questions, then share with the class for a discussion: *Why is it important to eat the recommended amounts of fruits and veggies each day? How do the different parts of a meal work together? Which red and orange vegetable do I eat the most? What surprised me the most about the recipe I made and tasted in class?*

EXTENSIONS

Cafeteria Scale. Have students interview the school Food Service Director to learn how to calculate the amount of a particular fruit or vegetable prepared in the cafeteria each day. For instance, how much spinach is needed to make salads for the school lunch? How many salads does this amount make? How much spinach is in each salad? How does that compare to the volume of what the student might prepare at home? Students will find the difference in scale astonishing!

ACTIVE GARDENING (PHYSICAL EDUCATION)

Just as there are recommended daily servings of fruits and vegetables, there's a recommended amount of physical activity that kids need each day, and that's at least 60 minutes – most of which should really get your heart beating. Everything counts – even short bursts of activity throughout the day will add up!

GARDEN TEAMS

There are many ways to be active in the garden. Have students think about and create a list of gardening tasks that gets them moving (for example, weeding, raking, shoveling, watering, pushing a wheelbarrow, planting). Assign garden teams to a task. Students should spend approximately five minutes performing each, and then rotate with another team so that they are given an opportunity to engage in all tasks.

Host a garden-themed "field day" with fun activities like a wheelbarrow race, grasshopper jump, or water-can relay.