



Manager's Corner

Weight and Volume

PROJECT COORDINATOR

Chef Patrick Garmong

EXECUTIVE DIRECTOR

Aleshia Hall-Campbell, PhD, MPH



NUTRITION



OPERATIONS



ADMINISTRATION



COMMUNICATIONS/
MARKETING

Institute of Child Nutrition

The University of Mississippi

The Institute of Child Nutrition was authorized by Congress in 1989 and established in 1990 at the University of Mississippi in Oxford and is operated in collaboration with The University of Southern Mississippi in Hattiesburg. The Institute operates under a grant agreement with the United States Department of Agriculture, Food and Nutrition Service.

PURPOSE

Improve the operation of child nutrition programs through research, education and training, and information dissemination.

VISION

Lead the nation in providing research, education, and resources to promote excellence in child nutrition programs.

MISSION

Provide relevant research-based information and services that advance the continuous improvement of child nutrition programs.

This project has been funded at least in part with Federal funds from the U.S. Department of Agriculture, Food and Nutrition Service through an agreement with the Institute of Child Nutrition at the University of Mississippi. The contents of this publication do not necessarily reflect the views or policies of the U.S. Department of Agriculture, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. government.

The University of Mississippi is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA Employer.

In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability.

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights; Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

© 2019, Institute of Child Nutrition, The University of Mississippi, School of Applied Sciences

Except as provided below, you may freely use the text and information contained in this document for non-profit or educational use with no cost to the participant for the training providing the following credit is included. These materials may not be incorporated into other websites or textbooks and may not be sold.

Suggested Reference Citation:

Institute of Child Nutrition. (2019). *Manager's corner: Weight and volume*. University, MS: Author.

The photographs and images in this document may be owned by third parties and used by the University of Mississippi under a licensing agreement. The University cannot, therefore, grant permission to use these images.

For more information, please contact helpdesk@theicn.org. November 22, 2019

Table of Contents

Professional Standards	1
Introduction	1
Lesson Overview.....	2
Questions for Staff.....	3
Activity: Weight vs. Volume	4
References.....	8

Professional Standards

FOOD PRODUCTION – 2100

Employee will be able to effectively utilize food preparation principles, production records, kitchen equipment, and food crediting to prepare foods from standardized recipes, including those for special diets.

2130 – Culinary Skills

Develop culinary skills necessary for school meal preparation.

Introduction

Manager's Corner: Weight and Volume is designed to empower managers to use in training their staff. Each lesson is roughly 15 minutes. This lesson plan contains:

- Learning objective
- Statement explaining the importance of the topic
- List of materials
- Instructions on how to present the information
- Questions to ask staff
- An activity to strengthen or refresh the knowledge of the staff

Lesson Overview

Instructions for lesson:

- Review the lesson objective and background information.
- Review why it is important.
- Ask staff the questions.
- Facilitate the activity outlined.
- Provide time for staff to ask questions.

Objective: Distinguish between measuring weight and volume.

Background information: Standardized recipes are used in school nutrition programs to ensure that consistent, quality products are produced in the amounts or portions that are needed for service. One way to ensure you are using the proper culinary technique is by using the correct volume or weight in a standardized recipe. To get the desired recipe results, ingredients must be weighed or measured correctly. Recipes indicate the amount of each ingredient to use in two ways—by volume or weight.

Volume refers to the amount of space an ingredient occupies in a measuring container and is expressed in terms such as teaspoons, cups, and gallons. Weight refers to the heaviness of an ingredient and is expressed in terms such as ounces and pounds. Weighing ingredients is considered the more accurate measurement of the ingredient.

Proper Measuring Techniques

- Dry ingredients – first “fluff” the dry ingredient to aerate the product, then spoon or scoop ingredient lightly into the measuring cup.
- Liquid ingredients – fill measuring container, and then place the container on a level surface. View at eye level to be sure the top of the liquid aligns with the appropriate measurement line.

Proper Weighing Techniques

- If a fixed dial scale, weigh the container you plan to use to weigh food. Use a permanent marker to write the weight of the container on the bottom of the container so you do not have to do this step again.
- If an adjustable dial scale, place container on the scale, then “tare” the scale by moving the dial indicator to the zero mark. If using an electronic scale, simply press the “tare” button to zero the scale.

Why it is important: Accurately measuring ingredients for production helps to ensure standardized recipes are precisely replicated at each production site.

Questions for Staff

- **What are some measuring tools we have in our school kitchen?**

Possible Answers: Measuring cups (1 quart, 1 cup, ½ cup, etc.), scales (fixed dial or adjustable dial), steamtable pans (2 inch, 4 inch, etc.), ladles/portion servers (1 oz., 2 oz., etc.), scoopes (Size/No. 6, 8, 10, etc.).

- **Why should we measure weight and volume when preparing food/menu items?**

Answer: Measurements for weight and volume must be taken for ingredient amounts to ensure proper preparation methods (which helps maintain the consistency of the food produced) and for meeting dietary specifications and nutrition standard guidelines.

- **What is weight?**

Answer: Weight is the measure of how heavy something is.

- **What is volume?**

Answer: Volume is the measure of how much physical space something occupies.

- **How are weight and volume measured?**

Answer: The most common units of measure for volume are milliliter (mL), teaspoon (tsp), tablespoon (Tbsp), fluid ounce (fl oz), cup (c), pint (pt), quart (qt), liter (L), and gallon (gal). For weight, there are only three common units of measure: gram (g), ounce (oz), and pound (lb).

- **What is the correct way to measure or weigh wet and dry ingredients?**

Answer: It is important to follow the correct technique for measuring and weighing. Weigh and measure your ingredients for a recipe before combining.

- Measuring Techniques

- Dry ingredients – first “fluff” the dry ingredient to aerate the product, then spoon or scoop ingredient lightly into the measuring cup.
- Liquid ingredients – fill measuring container, and then place the container on a level surface. View at eye level to be sure the top of the liquid aligns with the appropriate measurement line.

- Weighing Techniques

- If a fixed dial scale, weigh the container you plan to use to weigh food. Use a permanent marker to write the weight of the container on the bottom of the container so you do not have to do this step again.

- If an adjustable dial scale, place container on the scale, then “tare” the scale by moving the dial indicator to the zero mark. If using an electronic scale, simply press the “tare” button to zero the scale.
- **Why is using weight as a factor of measurement more accurate than using volume for the factor of measurement?**
Possible Answers:
 - Volume can vary in accuracy due to how the item is placed in the measuring tool (e.g., flour being scooped into a measuring cup with a spoon versus using a measuring cup to scoop flour out of the container).
 - Variations can exist in the way an item is cut or made (e.g., finely shredded cheese versus standard shredded cheese).

Activity: Weight vs. Volume

Activity materials included in this document:

- **Activity: Team Weight Instructions**
- **Activity: Team Volume Instructions**
- **Master Recipe**

Materials provided by the school nutrition operation:

See activity for list of equipment and supplies. Print the following handouts prior to training.

- One Person
 - Activity: Weight vs. Volume (Measure)
- One for each corresponding team
 - Team Weight Instructions
 - Team Volume Instructions
- Writing utensils

Activity Instructions:

Prior to training, gather the listed equipment and supplies for each team. Provide each team with the listed ingredients, equipment, and directions for their designated team activity.

Follow proper handwashing procedures.

Divide the group into two teams.

- Team one is Team Weight
- Team two is Team Volume

Each team will complete the activity by portioning the listed ingredients, only using the equipment specified, to portion out the ingredients for basic biscuit dough. The activity will illustrate the difference between using weight and volume for factors for measuring.

Have teams discuss and reflect on the activity.

Optional Activity: The master recipe for 50 servings of biscuits is provided to allow teams to complete the entire process and further demonstrate the difference in product quality and yield.

Activity: Team Weight Instructions

Directions: Only using a scale as the tool of measurement (no measuring cups, measuring spoons, or liquid measuring containers), complete the following steps to prep the ingredients for making basic biscuit dough.

- Measure out the ingredients in the listed portions
- Portion each ingredient into individual mixing bowls

Equipment and Supplies:

- 1 scale - digital or adjustable dial - able to measure both grams and ounces
- 6 mixing bowls, one for each ingredient
- 1 cutting board
- 1 chef's knife
- 1 water pitcher
- 1 small serving spoon
- 3 large serving spoons
- 4 lb whole wheat/enriched blend flour
- 5 oz instant nonfat dry milk
- 3.5 oz baking powder
- 2 oz salt
- 1 lb trans fat-free margarine
- 40 fl oz water

Recipe Portions:

Ingredients	Weight
Whole wheat/enriched blend flour	3 lb
Instant nonfat dry milk	3 oz
Baking powder	2 ¾ oz
Salt	0.60 oz
Trans fat-free margarine	11 ½ oz
Water, cold	30 oz

Activity: Team Volume Instructions

Directions: Only using measuring cups, measuring spoons, or liquid measuring containers (no scales), complete the following steps to prep the ingredients for making basic biscuit dough.

- Measure out the ingredients in the listed portions
- Portion each ingredient into individual mixing bowls

Equipment and Supplies:

- 1 one cup measuring cup
- 1 two-quart liquid measuring cup
- 1 tbsp measuring spoon
- 1 half Tbsp measuring spoon
- 6 mixing bowls, one for each ingredient
- 1 cutting board
- 1 chef's knife
- 1 water pitcher
- 1 small serving spoon
- 3 large serving spoons
- 4 lb whole wheat/enriched blend flour
- 5 oz instant nonfat dry milk
- 3.5 oz baking powder
- 2 oz salt
- 1 lb trans fat-free margarine
- 40 fl oz water

Recipe Portions:

Ingredients	Measure
Whole wheat/enriched blend flour	2 qt + 3 cup
Instant nonfat dry milk	1 ¼ cups
Baking powder	¼ cup + 2 ½ Tbsp
Salt	1 Tbsp
Trans fat-free margarine	1 ¾ Cups
Water, cold	3 ¾ Cups

Master Recipe: USDA Baking Powder Biscuits B-04

Makes: 50 Servings

Ingredients	Weight	Measure	Directions
Whole wheat/enriched blend flour	3 lb	2 qt + 3 cup	1. Blend flour, dry milk, baking powder, and salt in mixer for 1 minute at low speed. 2. Add Trans fat-free margarine and blend into dry ingredients for 2 minutes at low speed. Mixture will be crumbly. 3. Add water and mix for approximately 1 minute on low speed to form soft dough. Scrape bowl as necessary during mixing. 4. Turn out onto lightly floured surface. For 50 servings, knead ball of dough lightly for 1 minute. 5. Roll or pat out each ball of dough to ½" thickness. Cut with floured 2 ½" biscuit cutter and place on sheet pan (18" x 26" x 1") in rows of 5 across and 10 down. For 50 servings, use 1 pan. 6. Bake until lightly browned: Conventional oven: 450 °F for 12-14 minutes Convection oven: 400 °F for 8-10 minutes
Instant nonfat dry milk	3 oz	1 ¼ cups	
Baking powder	2 ¾ oz	¼ cup + 2 ½ Tbsp	
Salt	0.60 oz	1 Tbsp	
Trans fat-free margarine	11 ½ oz	1 ¾ Cups	
Water, cold	30 oz	3 ¾ Cups	

References

- Institute of Child Nutrition. (2015). *Basics at a Glance*. Retrieved from <https://theicn.org/icn-resources-a-z/basics-at-a-glance/>
- Public Schools of North Carolina. (2016) *TIF short set: Measures*. Retrieved from <https://childnutrition.ncpublicschools.gov/continuing-education/nc-k-12-culinary-institute/instruction-tools/tif-handouts/meas-weigh.pdf>
- United States Department of Agriculture. (2014). *USDA Recipes for Schools – Baking Powder Biscuits*. Retrieved from <https://theicn.org/cnrb/recipes-for-schools/>
- United States Department of Agriculture. (2015). *Professional standards for school nutrition professionals*. Retrieved from <https://www.fns.usda.gov/school-meals/professional-standards>

Manager's Corner: Weight and Volume



The University of Mississippi
School of Applied Sciences

800-321-3054
www.theicn.org