

UNIVERSITY OF MINNESOTA
DOCUMENTS

FOOD SCIENCE AND NUTRITION NO. 28—Revised 1976
MARY DARLING and DEBORA WARDLE

ST. PAUL CAMPUS LIBRARIES

Metric measure for home recipes

In the home, the metric system probably will be adapted gradually with both systems being used for many years. As time passes, more and more ingredients will be sold by the metric measure, and the homemaker will find it more convenient to cook with the metric system. Metric cookbooks and measuring utensils will be sold. With a metric cookbook and metric utensils, it will be just as easy as following the customary measure cookbook and using the customary measure utensils. Conversion will not be necessary. Both systems can co-exist.

There are two methods to measure dry ingredients when using the metric system: by weight (grams) and by volume (milliliters).

METHOD ONE: Using Volume Measures

Cooking is done by volume with customary measures. The ounces printed on measuring cups are volume ounces, not weight ounces. Measuring spoons, tablespoons, and teaspoons are volume measures.

When using the metric volume measurements, we will be measuring in milliliters. Liquids will probably always be measured in milliliters (1 ml = 1g of water). The word "cup" or "spoon" will not be used on new metric measures or metric recipes.

The one cup customary measure is about 237 milliliters. This uneven number is difficult to work with, so it is rounded to one-fourth of a liter or 250 milliliters.

Table 1: Comparison of Customary and Metric Volume Measures

	Customary Measures		Metric Measures	
	Ounces	ml	Liter	ml
1 qt.	32	946.36	1000	500
1 cup	8	236.59	250	125
1/2 cup	4	118.29	*	125
1/3 cup		78.86	*	
1/4 cup	2	59.14	*	
1 T.	1/2	14.79	15	
1 tsp.		4.93	5	
1/2 tsp.		2.46	2	
1/4 tsp.		1.23	1	

*Two or three measures between 15 and 125 ml will be available but their units have not been established yet by the American National Standards Institute Subcommittee.

The metric measure may be calibrated in fractions such as 1/2 or 1/4 like the customary cup. The fractions make recipe conversion simpler for the homemaker but one advantage of the metric system—fewer fractions—would be defeated.

Measuring spoons, a volume measure, may be expressed in milliliters. For example the volume metric measurer replacing the teaspoon would be 5 milliliters; the tablespoon would be 15 milliliters.

METHOD TWO: Using Weight Measures

The other method is to measure by mass or weight. Weight is expressed in grams and a scale is used. This method of measuring is more accurate, and for ingredients like flour, it is simpler since one does not have to sift, spoon, or level. However, American women probably will not weigh ingredients because they traditionally have used volume measures.

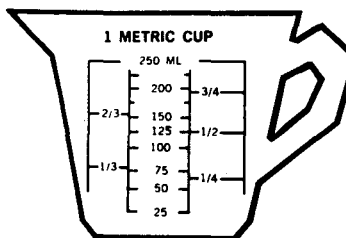
Ingredients differ by weight. For instance, 1 cup of flour does not weigh the same as one cup of sugar. If you are using an old recipe in the customary measure and trying to convert it to the metric system, you need to know each ingredient's weight. Two good sources for information pertaining to weight of ingredients are Home and Garden Bulletin No. 72, Nutritive Value of Foods, and Average Weight of a Measured Cup of Various Foods by Agricultural Research Service (ARS 61-6).

Seasonings and leavening agents that usually are measured in teaspoons (5 ml) or tablespoons (15 ml) may continue to be measured by volume. Accurately measuring amounts of 5 grams or less will be difficult on most kitchen scales. The weights of commonly used seasonings or leavenings are listed in Table 2 for your information.

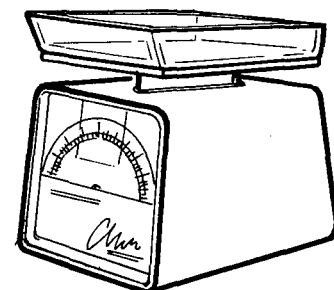
Table 2: Weight of Seasonings and Leavenings*

	1 teaspoon (5 ml)
mustard, ginger	1.5 g
allspice, cinnamon, cloves	1.7 g
nutmeg	1.9 g
black pepper	2.3 g
active dry yeast	2.5 g
cream of tartar, baking powder	3.2 g
salt	6.0 g
baking soda	4.0 g

*Taken from Research Committee of the American Spice Trade Association and the Handbook of Food Preparation, American Home Economics Association, 1971.



Volume measure
milliliters (ml)



Weight measure
grams (g)

Table 3 gives the weight (grams) of the customary measures of common baking ingredients. Rounding it off a few grams will not result in a poor quality product because recipes can tolerate this variability. The customary measures are at the top of each column, followed by metric weights corresponding to the customary measures. For example, $\frac{1}{4}$ cup of bread crumbs weighs 25 grams. The weights in this chart are in grams.

Table 3: The Weight in Grams of Common Baking Ingredients

Ingredients	Measures					
	1 c.	3/4 c.	2/3 c.	1/2 c.	1/3 c.	1/4 c.
	Weight in Grams					
bread crumbs, dry	100	75	66	50	33	25
butter and margarine	226	169	150	113	75	56
cake flour, enriched	96	72	46	48	23	24
cocoa, dry	86	64	56	43	28	21
cornmeal	148	111	98	74	49	37
flour, sifted all purpose	116	87	78	58	39	29
flour, unsifted all purpose	140	105	94	70	47	35
milk, instant dried	68	51	46	34	23	17
nuts, chopped	119	87	80	59	40	28
oatmeal, dry	71	53	48	35	24	18
peanut butter	251	187	168	125	84	62
raisins	143	106	48	71	47	35
rice, uncooked long grain	198	150	132	99	66	50
shortening	226	169	150	113	75	56
sugar, brown packed	220	165	146	110	73	55
sugar, granulated	200	150	134	100	67	50
sugar, powdered unsifted	123	92	82	61	41	31

As we go metric, thermostats and thermometers will change from the Fahrenheit scale to the Celsius scale. Oven temperature, internal temperatures for roasting meat, and temperatures for deep frying are just a few of the ways we use temperatures in the kitchen. To help with the conversion, a chart with both temperature scales can be found in Metrics in the Kitchen (Extension Folder 294).

Often measurements are not used. If you think back to yesterday's meal preparation, how much was actually counted instead of measured? For instance, you might have used 1 onion, 3 potatoes, and 6 carrots in a stew. No actual measurement was used. Other times, you might use foods in the market units, for instance, 1 can of tomato sauce or 1 package of frozen corn.

Remember that a good cook uses her skills and good judgment to turn out a good product. The experienced cook notices the major imbalances in the levels of various ingredients by the way the food looks, feels, and tastes, and adjusts accordingly. Without a recipe she or he knows how to make good gravy or how much liquid to add for creamier mashed potatoes. The good cook's skills and judgments are needed and may prevent some problems when changing to metric measures.

SAMPLE RECIPES

Spanish Noodle Casserole

If you have bacon, fry a couple of slices in a large skillet. Save to add later. Drain off most of the fat. Brown the following in a skillet:

Customary System	Metric System	
	By weight nonliquid ingredients	By volume 1 cup = 250 ml
1/2 lb. ground beef	250 g	250 g
1 teaspoon salt	5 ml	5 ml
1/4 teaspoon pepper	1 ml	1 ml
1/2 cup chopped onion	90 g	125 ml
1/2 cup chopped green pepper	75 g	125 ml
Add:		
3 1/2 cups cooked tomatoes or tomato juice	840 ml*	855 ml
2 cups uncooked noodles	75 g	500 ml

Stir until well mixed. Cover skillet and cook until noodles are tender. Add crumbled up bacon before serving.

Cornbread

Customary System	Metric System	
	By weight nonliquid ingredients	By volume 1 cup = 250 ml
1 cup cornmeal	150 g	250 ml
1 cup flour, (sifted)	115 g	250 ml
1/4 cup sugar	50 g	50 ml
4 teaspoons baking powder	20 ml	20 ml
1/2 teaspoon salt	2 ml	2 ml
1 egg	1	1
1 cup milk	250 ml*	250 ml
1/4 cup butter, soft	55 g	50 ml

Sift together cornmeal, flour, sugar, baking powder, and salt into bowl.

Add egg, milk, and butter.

Beat with rotary beater until smooth, about one minute.

Bake in greased 8-inch (21 centimeters) square pan in preheated oven, 425° F (220° C) for 20 to 25 minutes.

*While liquids can be weighed on a scale, it is easier to measure their volume.

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Roland H. Abraham, Director of Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota 55108. We offer our programs and facilities to all persons without regard to race, creed, color, sex, age, or national origin.

The information given in this publication is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Minnesota Agricultural Extension Service is implied.