
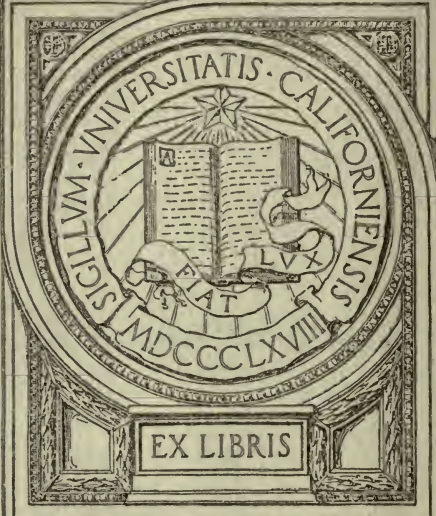


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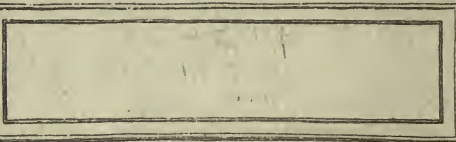
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MILK

and
Our School Children



Health Education No. 11

DEPARTMENT OF THE INTERIOR
BUREAU OF EDUCATION

1922

Health! Strength! Joy!



RULES OF
THE HEALTH GAME

- 1 A full bath more than once a week
- 2 Brushing the teeth at least once every day
- 3 Sleeping long hours with windows open
- 4 Drinking as much milk as possible, but no coffee or tea
- 5 Eating some vegetables or fruit every day
- 6 Drinking at least four glasses of water a day
- 7 Playing part of every day out of doors
- 8 A bowel movement every morning

LIBRARY OF
CALIFORNIA

MILK

and
Our School Children

By

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of Tennessee*



Prepared for

THE BUREAU OF EDUCATION *by the*
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NO 77

FOREWORD.

The material presented here was prepared by Miss Bernice Reaney as a thesis for a master's degree. As it was not possible to publish the entire thesis, owing to lack of space, it has been necessary in editing the publication to omit and abbreviate certain sections.

Part I of the thesis contained a very careful and detailed explanation of the method by which the data regarding the extent of the use of milk by school children was obtained. The facts brought out are of significance and importance, but it has seemed best to summarize these rather briefly, in order that greater space may be given Parts II and III, which offer so much in practical suggestion and concrete material.

This problem of how to interest children in drinking milk will have as many solutions as there are ingenious teachers who will work out the answer in the light of the individual needs of their respective pupils.

This pamphlet describes the steps by which one teacher in Grade III solved her particular problem. Facts about milk were presented, but the success of her work lay not in the facts taught or remembered but in the lesson learned: These children are now drinking milk.

add



Poster Made by a Child in Grade III.

PART I.

HOW MANY SCHOOL CHILDREN DRINK MILK?

What are the facts?

The best way to find out is to ask the children themselves. That is just what was done in a recent investigation, the results of which are thoroughly disturbing.

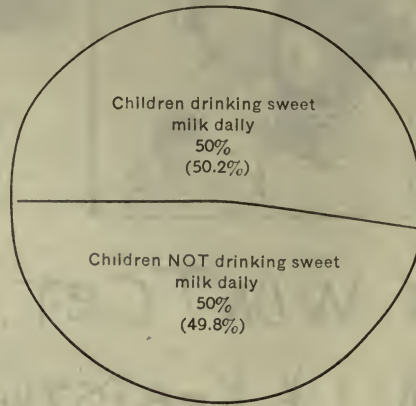
Imagine a group of 7,738 American school children representing a fair cross section of a number of elementary schools covering several States. In this group are children of all grades from the first to the eighth. They are the boys and girls we all know so well, some bright and gay and attractive, some a little ragged, most of them full of the quick response to suggestion that is characteristic of the American school child.

They were asked whether they drank whole milk. The question was printed on cards, and answered at home. Only 50 per cent responded "yes" to this question.

Considering the recognized food value of milk, it seems to be a critical situation that 3,856 children out of the 7,738 are not drinking whole milk.

But that is not the only fact that the investigation unearthed. Seventy-five per cent reported liking milk. Fifty per cent had a chance to drink it, and drank it, as has been stated. Twenty-five per cent reported liking to drink it, but never having a chance.

DIAGRAM NO. 1.



It was found that in practically all cases in which children said they liked milk, and yet did not get it, there was no milk bought in the home. The problem is not entirely economic in these cases—it reflects a general lack of knowledge of the food value of milk.

Tea and coffee were found to be freely used by the children. Eighteen and a half per cent are drinking tea regularly, and most of these are children of the first four grades. Of these tea-drinking babies, 54 per cent did not drink milk. Thirty-eight and a half per cent of the 7,738 children drink coffee regularly. Some of the coffee drinking was in the upper grades, but there was plenty of it among the smallest children. Thirty-four per cent of the children of the first grade drink coffee regularly. And of the coffee drinkers, 58 per cent do not drink milk. The investigation furnished many interesting details, but it teaches one big lesson: **American parents and children must be taught the nutritional value of milk.**

PART II.

WHY SCHOOL BOYS AND GIRLS NEED MILK.

Nature provides milk for the feeding of the young of all higher types of animals. Cow's milk for the calf, mare's milk for the colt, and mother's milk for the baby are almost perfect in food value. Cow's milk for the baby does not contain nature's exact proportions

of necessary food elements, although each class of foods is represented. The word milk in this country generally denotes cow's whole milk.

Childhood is the period of growth. If children are to have strong bodies, it is important that they use the best building material. We have no food which contains as many of the elements necessary for growth and repair as does milk.

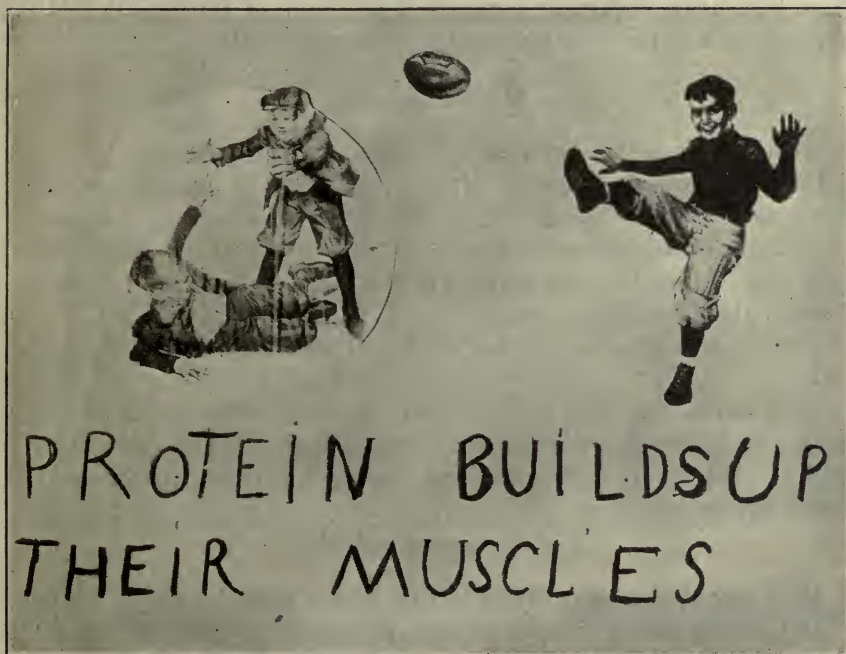
In addition to material for growth, children need fuel to keep the body warm and to supply energy for muscular activities. Milk contains those substances which provide good fuel.

Foods Contained in Milk.

Protein is essential for building and repairing the muscle tissue. Milk contains 3.5 per cent of this valuable class of food.

Protein is also found in meat, fish, eggs, cheese, peas, beans, and cereals, but some protein from milk and animal foods seems to be necessary for good health and bodily resistance.

As the curd of milk contains most of the protein, cottage cheese is rich in this muscle-building food. If more protein is obtained than can be used for tissue building it is used as a fuel—giving heat and energy to the body. However, for fuel it is generally considered



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best not to use protein foods in the place of carbohydrates or fats, as this puts too great a tax upon the digestive activities.

Skimmed milk and buttermilk are a source of inexpensive protein even though all or nearly all the fat has been removed.

As soon as the milk reaches the stomach it is formed into curds by the action of the gastric juices. This process of coagulation may be illustrated by the making of junket. The commercial preparation of rennin used in making junket is generally obtained from the stomach of the calf.

Fat in Milk.

The fat found in milk is a very valuable food. It supplies heat for warmth and energy to the body and builds adipose tissue. The most important sources of fat in large amounts are cream, butter, olive oil, cotton-seed oil, bacon, and fat meats.

Food materials are often referred to in relation to the amount of heat which they are able to produce. The unit of measuring heat is called a calorie. A calorie is the amount of heat required to raise a kilogram (2.2 pounds) of water 1° C. Fat yields nine calories of heat for every gram used. About five-eighths of a glass of milk will yield 100 calories.

Sometimes unscrupulous milk dealers add water to milk, or skim the cream from the milk. For this reason the majority of our States have legislation requiring a standard minimum of fat in milk. Milk containing 3.75 per cent fat is considered good milk.

Mineral Elements.

About seven-tenths per cent of milk is mineral matter.

One of the most valuable of these minerals is calcium or lime. Lime helps to build bone. If children are to have strong bones and firm white teeth, they must have lime and plenty of it. Milk is not only rich in lime but is also perhaps the cheapest food for supplying lime in the necessary quantity.

Phosphorus, necessary to the tissues of the body, is also found in milk.

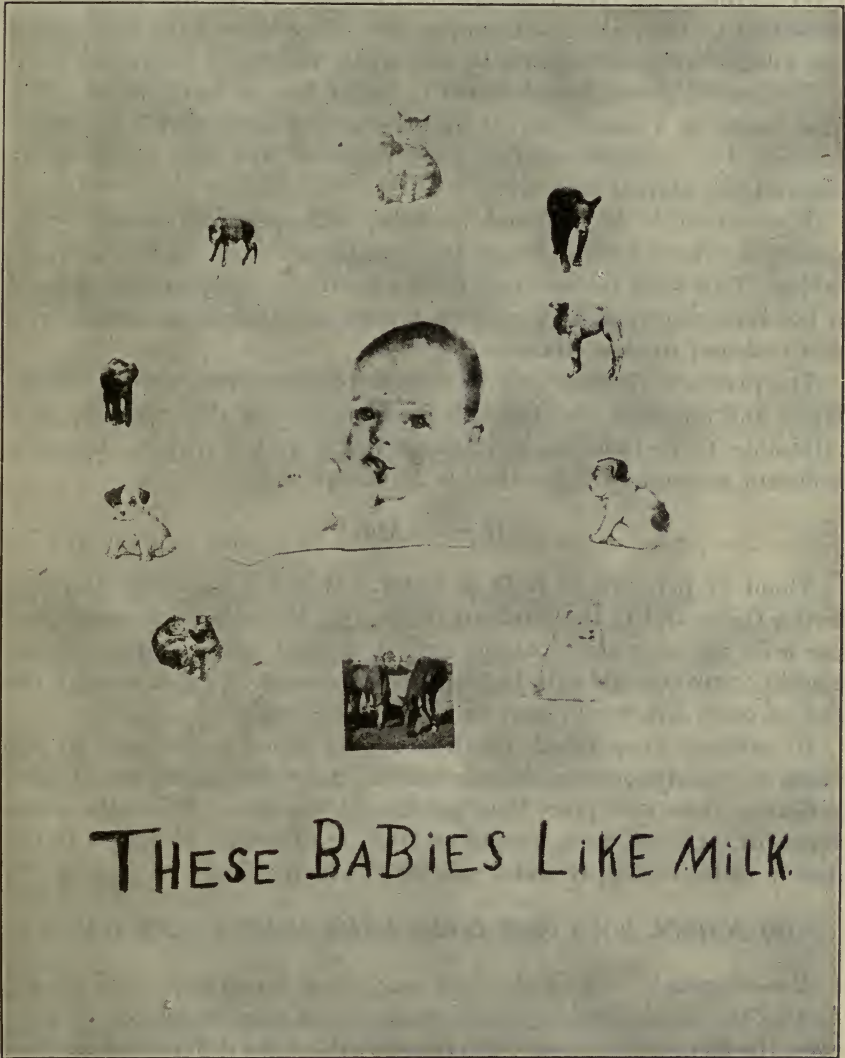
Milk contains a very valuable form of iron, but in small amount, so that it is necessary for children to eat plenty of other foods which will also supply iron, such as green vegetables, fruits, egg yolks, and whole grains.

Carbohydrates in Milk.

Milk contains a sugar called lactose, which makes it sweet. When milk bacteria act on lactose, an acid is formed known as lactic acid. Sour milk is milk which has begun to separate into curds and whey. The whey of milk contains most of the sugar. Lactose is easily

digested and gives warmth and energy to the body. The average amount of lactose in milk is 5 per cent.

This sugar of milk belongs to that group of foods including all sugars and starches called carbohydrates. Although lactose is more quickly and easily digested than the starch found in cereals and



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vegetables, carbohydrates may be obtained with less expense from the latter, and these foods also help to keep the digestive tract in good condition. Therefore, cereals and vegetables should supplement milk in the diet.

Vitamines.

In milk are found also the accessory food factors which have been called vitamines. Beyond the fact that vitamines are essential to the promotion of health and normal development, little is known about their exact nature and composition. At least three of these food factors have been distinguished because of the different effects produced by their absence from the diet; these three have been called fat soluble A, water soluble B, and water soluble C vitamines.

Fat soluble A was first detected in butter fat and egg yolk, and it is also found in a lesser degree in tomatoes, carrots, and leafy vegetables. The presence of this food factor in the diet seems to be essential to normal growth.

Water soluble B is found in milk, milk products, whole grain products, citrus fruits, orange juice, nuts, tomatoes, and most vegetables. This food factor seems to be essential in maintaining life and it has been shown that the disease known as beri-beri is a result of a diet deficient in this vitamine.

The presence of *water soluble C* in the diet prevents scurvy. Since fruits and tomatoes are especially rich sources for this vitamine, it is advisable to include some of these foods in the diet to insure a sufficient amount of this valuable substance.

Water in Milk.

About 87 per cent of milk is water. Water is necessary to every living tissue and to the fluids of the body. However, one should not use milk for its water content; milk is a food, not a drink. If one should drink enough milk to supply the amount of water needed, the rest of one's diet would have to be much reduced.

In making evaporated, condensed, and dried milk, part of the water is removed; therefore, when milk in concentrated form is used, sufficient water to replace that lost should be added. When the above forms of milk are used, tomato or fresh fruit should be added to the diet in order to supply water soluble C which is lost.

DO SCHOOL BOYS AND GIRLS NEED MILK EVERY DAY?

Yes—because milk is the best and most important food in the diet of the school child. No other food can take its place. It contains the elements necessary for the growth of the different structures of the body and supplies heat and muscular activity.

As the fat of milk is especially valuable for its growth-promoting qualities, children should, if possible, have unskimmed milk. If for any reason the fat of milk (cream) must be removed, fat should be supplied in the form of butter. Butter substitutes may be used, but should not be given as the sole fat unless plenty of green or leafy vegetables are used every day.

Children over five years of age should usually have one pint of milk a day. If children will not drink milk readily, it may be given in the following forms: Creamed soups, sauces and vegetables, cocoa, egg-nogs, junket, milk puddings, milk cooked with cereals, cottage cheese, frozen creams, and milk sherbet.

It is better not to give very cold milk to children.

In addition to milk, the diet of the school child should always contain cereals, vegetables, and fruit.

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- II. United States Bureau of Education. Health Education Series No. 2—The Diet of the School Child.
- III. United States Department of Labor. Care of Children Series, Bulletin No. 35—Milk the Indispensable Food for Children. Mendenhall.
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Children at Work Demonstrating Milk Facts in the Classroom where these Lessons were Developed.

PART III.

MILK FACTS MADE REAL.

(Outline of a series of 12 lessons given in the third grade of the Peabody Demonstration School Nashville, Tenn.)

The classroom where these lessons were given might have been any classroom, in any school, in any locality. In one corner was an improvised kitchen containing an oil stove, a table, cooking utensils, spoons, etc. Each child was asked to bring an apron. The boys were not "aproned" the first two days, but the third lesson found them completely equipped.

Perhaps the one person who contributed most largely to the success of the project was the enthusiastic and cooperative grade teacher. She saw the educational opportunity, welcomed it, and utilized it.

During the twelve days of milk study, the spelling, language, arithmetic, and drawing lessons were correlated, and milk problems crept skillfully and beguilingly into every crack and cranny of the regular work. The interest was intense.

At the first lesson it was found that three children in the class of thirty-six did not like milk; five others were not drinking it although they liked it. By the end of the eighth lesson every child was drinking at least one glass of milk a day.

By making the work simple and concrete, these third-grade children seemed to grasp the meaning of the composition of milk as completely as any sixth or seventh grade pupil. Through an oral

test, given three months later, the teacher found that the fundamental facts were remembered with surprising accuracy.

In three of the following reports the exact words of both instructor and pupils are given, just as they were recorded by a secretary. No alteration has been made except to add an occasional word necessary to complete a sentence.

Lesson 1.—The Use of Milk as a Food.

Demonstration: Pictures were used to illustrate this topic.

Points emphasized: Young animals depend upon milk for development during early stages of growth. Countries where milk is used. Description and pictures of dairy farms. Regulations regarding milk in the State and city. Amount of milk used in the home. Dishes in which milk is the main ingredient. Care of milk, with special emphasis on cleanliness.

Lesson 2.—Effect of Heat on Sweet Milk.

This lesson is given in detail on page 14. The important fact here taught the children is that they can enjoy milk and get its benefits when it is cooked as in cocoa or soup.

Lesson 3.—Effect of Heat on Sour Milk.

Lesson is given in detail because its chief value to the child is the knowledge he gets of the muscle-building substance in milk—namely, the curd. (See page 19.)

Recipe used in making the cottage cheese: Heat sour milk slowly until the whey separates from the curd. Pour off the whey, and put the curd into a bag of cheesecloth, and let the whey drip out for several hours. Do not squeeze the curd. Break the curd with a spoon or fork, and season with salt. Enough cream or butter is used to make the curd moist.

Lesson 4.—Fat in Milk.

Demonstration: Making of butter. Recipe used: Beat sweet thick cream in a bowl, or shake it in a glass jar. After the butter separates from the milk, wash it in cold water until all the milk is removed. Salt is added, if desired. (Butter served on saltines. Most of the children buttered an extra saltine to take home to show parents.)

Points emphasized: The difference in appearance and taste between whole milk, skimmed milk, and cream. Why cream comes to the top, and the skimming of cream. Heavy cream beaten thoroughly forms butter. Value of butter in the diet. Amount of cream necessary to make a pound of butter.

Scales were used and the children were taught to read them accurately.

Lesson 5.—Water in Milk.

Demonstration: A small amount of milk was cooked in crucible over Bunsen burner to drive off moisture. Samples of evaporated milk and condensed milk were shown. The children tasted these in the original form—then added water and tasted again. Discussion. Points emphasized: Value of drying milk. Disadvantages of using dried milk instead of fresh. The cost of each in comparison with fresh milk. Value of water in the diet. Approximate amount of water in milk.

Lesson 6.—Use of Dried Milk in Cooking.

Demonstration: As the children did not like concentrated milk in the raw state, a lesson was given to show use in cooking. Cream of tomato soup made from evaporated milk. The children prepared the soup and served it in cups with saltines.

Points emphasized: Value of milk as an ingredient in cooking. Other dishes which may be made with evaporated milk.

Lesson 7.—Sugar in Milk.

Given in detail on page 23.

Lesson 8.—Value of Milk as a Food (Review).

Demonstration: Junket was made to illustrate curd formation.

Points emphasized: General review on the composition of milk and its value as a food. Stomach action on milk forms curds. Necessity for drinking milk slowly.

Lesson 9.—Food Value of Milk in Comparison with That of Other Food Materials.

Demonstration: Samples of other common food materials, such as bread, potatoes, meat, green vegetables, fruit, sugar, etc., were placed on a table each in 100-calorie portions. It was shown that these are equivalent in energy value to five-eighths cup sweet milk. The children weighed and measured each portion of food material. Discussion.

Points emphasized: The advantages of milk.

Lesson 10.—The Economy of Milk.

Demonstration: Food materials used in lesson 9. Food materials arranged according to protein content to show the value of milk as a cheap source of nourishment. Rearrangement of food in order of calcium content, to show milk as a cheap source of lime.

Points emphasized: The prices of dairy products compared with those of other food materials.

Lesson 11.

The children made plans for an exhibit and party to demonstrate to their parents the value of milk as a food. All suggestions for posters, play, music, refreshments, etc., came from the class.

Lesson 12.

Exhibit and party. (See page 29.)



SHE MUST EAT
 $\frac{1}{4}$ LOAF OF BREAD
TO GET THE NOURISHMENT
IN 1 CUP OF MILK.

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LISTENING IN ON ACTUAL CLASSROOM LESSONS.

Lesson 2.

Instructor. What did we say yesterday about milk as nature's method of feeding animals?

Milton. We said milk is used by lots of baby animals to make them grow.

Instructor. What baby animals did we mention?

Eleanor. Calf and colt.

Joan. Pig.

Baxter. Puppy and kitten.

Isabelle. Bunny.

Instructor. When we speak of milk, we think of milk from what animal?

Rob. Cow.

Charlie. Goat.

Instructor. How many think of cow's milk if I say, "I drank a glass of milk this morning?" (*All hands but one.*) What kind of milk do you think of, Charlie?

Charlie. I guess I think of cow's milk, but I wouldn't if I lived in a country where they used goats. Then I'd think of goat's milk.

Instructor. What country would Charlie be living in if he thought of "milk" as goat's milk?

Nelson. Texas.

Runcie. They don't use goat's milk in Texas.

Instructor. No, I don't believe they use much goat's milk in Texas.

Nancy. Last night, I looked in a book about goat's milk, and it said in France and Switzerland the goats came around to the door, and people went out and milked them. Whenever they wanted milk, they would order goats to come around.

Sam. I thought every family had their own goat, and milked it whenever they wanted some milk.

Geraldine. Probably everybody couldn't afford to own a goat.

Instructor. Yesterday I asked you to think of the names of other animals besides the cow and goat, which give milk for people to drink. What ones can you name?

Baxter. Camel is one.

Instructor. Yes, indeed. Where did you find out about the camel's milk being used for people to drink?

Baxter. My daddy told me.

Ann Ross. Buffalo is another.

Whitworth. Reindeer.

Martha. Mare.

Mary Bell. Llama.

Instructor. We have a long list, haven't we? Mrs. Cow isn't the only friend we have who supplies people with milk. What did we say yesterday, that we were going to begin to do to-day? (*All hands.*)

Eleanor. Find out why milk is good for us.

Lawrence. We were going to find out why milk is nourishing.

Bert. We were going to find out how to make Joan and Charles like milk.

Nancy. I looked in the Book of Knowledge about milk, and it said milk contained salts and sugar.

Instructor. I am glad Nancy thought about looking in the Book of Knowledge. I am sure she can help us a great deal.

Nancy. I brought the book to show you.

Instructor. Let's describe this milk as we see it here.

Mary. It's white.

Nelson. Milk is a liquid.

Richard. It's got cream on top.

Instructor. Which is heavier, a cup of cream, or a cup of milk?

All. Milk.

Instructor. Why does the cream come to the top?

Several. Guess it must be light.

Instructor. Those are good points. We will heat this sweet milk and see if it changes any with heat. Three of you may come to the table and each one put a pint of milk on the stove to heat.

Ann Ross. Shall we use this double pan?

Eugene. That is called a double boiler.

George. Shall we put milk in the top or bottom part?

Helen. Put it in the top.

Mary. You put milk in the top and water in the bottom.

Instructor. Why not put the milk in the pan right next to the fire?

George. It will scorch.

Instructor. Yes, and some of the important parts of the milk might stick to the pan. (*Children put the double boilers on the stove. Instructor lights the burners.*)

Bert. How are we going to teach Joan and Charles to like milk?

Amanda. Could we make hot chocolate?

Helen. We could use that hot milk after we are through with it.

Instructor. What materials do you use in making chocolate or cocoa?

Whitworth. Milk.

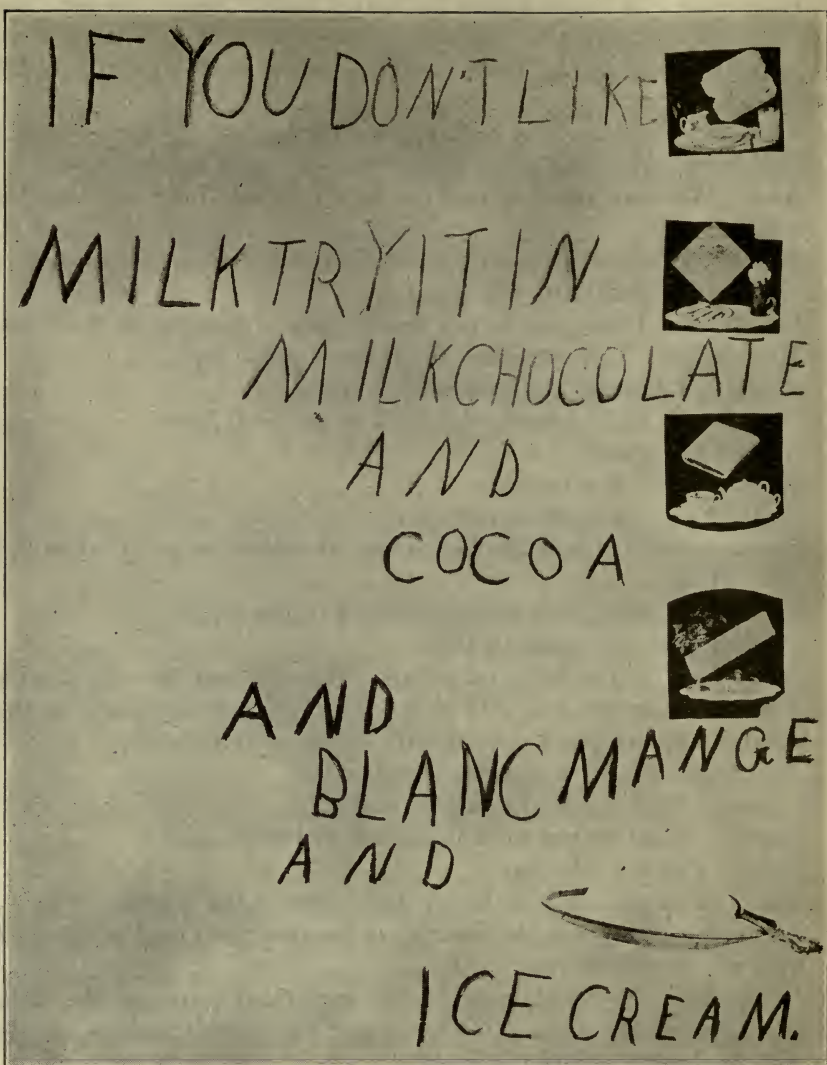
Elizabeth. Sugar.

Geraldine. Chocolate.

Eleanor. My mother uses cocoa.

Instructor. What is the difference in cocoa and chocolate?

Overton. Cocoa is in a box and powderlike; chocolate is in a cake.



Poster Made by a Child in Grade III.

Instructor. Which is richer?

Chester. Chocolate.

Instructor. Yes; cocoa has some of the fat removed. Look through our supplies, and see if we have the necessary material.

George. The milk is getting too hot. (*Several go to see.*)

Mary Todd. It has bubbles on it.

John. It's thicker.

Martha. Yes, much thicker. (*Instructor takes spoon and moves scum to one side.*)

Lawrence. It's got a funny, loose skin on top of it.

Instructor. Pass the pan of milk around, so everyone can see the little thin layer on top of hot milk. That little scum is an important part of the milk. The children with aprons on will make the cocoa, if Amanda finds we have the materials.

Amanda. I think we have everything that we will need.

Martha. How much cocoa shall we use?

Instructor. Martha wants to know how much cocoa to use. We want to have enough after it is made, so that each one of us may have a small cupful.

Joan. Use one teaspoon of cocoa for each cup.

Richard. I'd think it would take a tablespoon.

Amanda. My mother heats sweet milk, and puts cocoa in it, and cooks it a little while. She doesn't use sugar.

Nelson. That would taste bitter.

Amanda. Well, we put sugar in it before we drink it.

Instructor. How much sugar do you use?

Amanda. Almost two teaspoons.

Charlie. My mother uses about one-fourth cup of cocoa and a quart of milk, when we have it for Sunday supper.

Instructor. Shall we try Charlie's recipe?

All. Yes.

Instructor. Does your mother put sugar in the cocoa, Charlie?

Charlie. Yes, I think she uses about as much sugar as she does cocoa.

Instructor. How many cups of milk will we need?

William. We will need 36.

Geraldine. That will make too much.

Bert. I think 12 would be enough.

Instructor. How many quarts of milk would that be?

Bert. How many measuring cups are there in a quart?

Eleanor. May I measure cups of water in that empty quart bottle?

Instructor. Yes, I wish you would. Bert may help you. Let's make out our recipe to serve six people, six regular cups of cocoa. Since we are going to have but one-half a cup, a recipe for six would serve how many half-cups?

Tom. Six times 2 are 12.

Instructor. Yes. How many recipes will we have to make if 1 recipe will serve 12?

Tom.—Three times 12 equals 36, so we will need 3 recipes.

Instructor. Good.

Eleanor. Bert and I found that there are four cups in a quart.

Instructor. That is correct; there are four measuring cupfuls to a quart. Write on the board the proportions for our cocoa, Elizabeth. (*Elizabeth writes* " $\frac{1}{4}$ cup cocoa.")

Elizabeth. I forget how much sugar.

Helen. Use one-fourth cup of sugar, too. (*Elizabeth writes*
"¼ cup sugar, 1 quart milk, 1 cup water.")

Instructor. To make the cocoa seem a little rich we often add a teaspoon of something which makes the cocoa a little thick. What is this "something?"

George. Egg.

Instructor. That is good but expensive.

William. Flour.

Instructor. Yes; flour would do, or we could use something very much like flour in appearance, but which is made from corn.

Martha. Cornstarch.

Elizabeth. Shall I add a teaspoon of cornstarch on the board?

Instructor. Yes, Elizabeth.

Tom. How do you mix the things together?

Eleanor. My mother mixes sugar and cocoa and adds some water and cooks that, then she puts the milk in.

Instructor. I think that is a good method to bring out the best flavor of cocoa. It is best to stir it, while it is cooking, so it won't burn.

Charles. Shall we mix this now?

Instructor. Yes, and add the cornstarch to the cocoa and sugar. (*Four children work together on one recipe, mixing and cooking.*)

Charles. It's cooked now: Shall we mix the cocoa and the hot milk together?

Instructor. Yes; put the cocoa mixture into the hot milk, then we are ready to serve. We will go to our desks now, and 12 children, who did not help in making the cocoa, may act as our hosts and hostesses. After they have served you, they may serve themselves.

Geraldine. Will we get to pour it in cups, and pass it?

Instructor. Yes; we have some saltines, too, which we will pass with the cocoa. (*Cocoa is passed; saltines are passed.*)

Bert. Charles is drinking cocoa.

Chester. So is Joan.

Instructor. Do you like the cocoa, Charles?

Charles. Yes, Miss Reaney.

Instructor. Do you get the same nourishment from the milk as you would if you were drinking plain milk?

Charles. I am getting the same nourishment, but it don't taste like milk.

Instructor. Joan, do you like the cocoa?

Joan. Yes, I like it very much.

Instructor. The hosts and hostesses will please stay a little while after the class is dismissed to wash the dishes. To-morrow we will see if other things may be found out about milk.

Instructor. Let's try heating this milk to see if we have the same thing happen to it that happened to the sweet milk yesterday.

Eleanor. It is sour, isn't it?

Baxter. Looks like clabber.

Instructor. Yes, it is the milk we left in the room during our first lesson, and it has become sour.

Nancy. May I put the milk in a pan over the boiling water?

Instructor. Yes, Nancy; you may watch one quart of milk and Lawrence may watch the other quart while it is getting hot. (*Milk put in double boiler.*)

Instructor. What did we do in our last milk lesson?

Tom. Made cocoa.

Instructor. What was the reason we wanted to make cocoa?

Tom. To find out more about milk.

Nelson. To show how other things may be added to milk.

Geraldine. To see the skim on top of milk.

Bert. So Joan and Charles would drink some milk.

Helen. We wanted to make cocoa so that we could see how milk could be changed so it didn't taste like milk, or look like milk, yet the milk was still there.

Instructor. How did we make the cocoa?

Helen. We mixed the cocoa, sugar, cornstarch; then we added water and cooked that a little while. After that we added the hot milk.

Instructor. That was a splendid answer. What were the proportions we used, Elizabeth? (*Teacher writes on the board.*)

Elizabeth. One-fourth cup of cocoa; one-fourth cup of sugar; one teaspoon of cornstarch; one cup of water; one quart of milk; a few grains of salt on end of teaspoon.

Instructor. How did you happen to remember the recipe so well, Elizabeth?

Elizabeth. Isabel and I made some last night.

Charles. Lawrence made some last night.

Instructor. That is fine, Lawrence. Was it good?

Lawrence. Everybody thought it was the best they ever had.

Tom. I'm going to make some when I get home to-day.

Instructor. When we heated the sweet milk for the cocoa, what did we discover about milk?

Mary. It has a skin come on it when it's hot.

Geraldine. That's the best part of the milk, isn't it?

Instructor. It is a very important part and should never be taken off, but should be stirred into the milk.

Nancy. Miss Reaney, come here quick. Some of the water from the lower part of the pan has got in top with the milk. (*Children go to stove to see.*)

Lawrence. I think that's water on top.

Nancy. Where did it come from?

Tom. It's water in the milk.

Martha. It is, Miss Reaney?

Instructor. Look at the pans carefully to see if the water could have gone from the bottom to the top.

Lawrence. No, it couldn't even if there was a hole, because water can't go straight up.

Mary Todd. It's water in the milk. I know milk has water in it, or else you couldn't pour it.

Instructor. We will strain the heated sour milk through a cloth. (*Children do so.*)

Lawrence.—Look at the lumps. Looks like cheese.

Geraldine. Maybe it is cheese.

Tom. It ain't cheese. They make cheese in a factory.

Joan. It is funny looking.

Martha. My uncle is a milkman, and when his milk becomes sour he makes cheese out of it.

Instructor. I want some one to taste this liquid, which we call whey. Do you remember what Miss Muffet ate?

Martha. Curds and whey.

Mary. That's what we make, isn't it?

Baxter. It tastes sweet.

Whitworth. I think it tastes sort of sweet.

Eleanor. It hasn't any taste to me—maybe it is a tiny bit sweet.

Instructor. What makes things sweet?

Milton. Sugar.

Instructor. Yes, milk contains sugar, and most of it is found in the whey. I have a box of milk sugar here. We will pass it around and you can look at it, and taste it. The water is all taken from the whey and sugar is left.

John. Looks like powdered sugar.

Instructor. What is the use of sugar in our diet?

Eugene. Makes things taste good.

Instructor. Yes, and sugar gives us power to do work, unless we eat too much. What do you eat that is sweet?

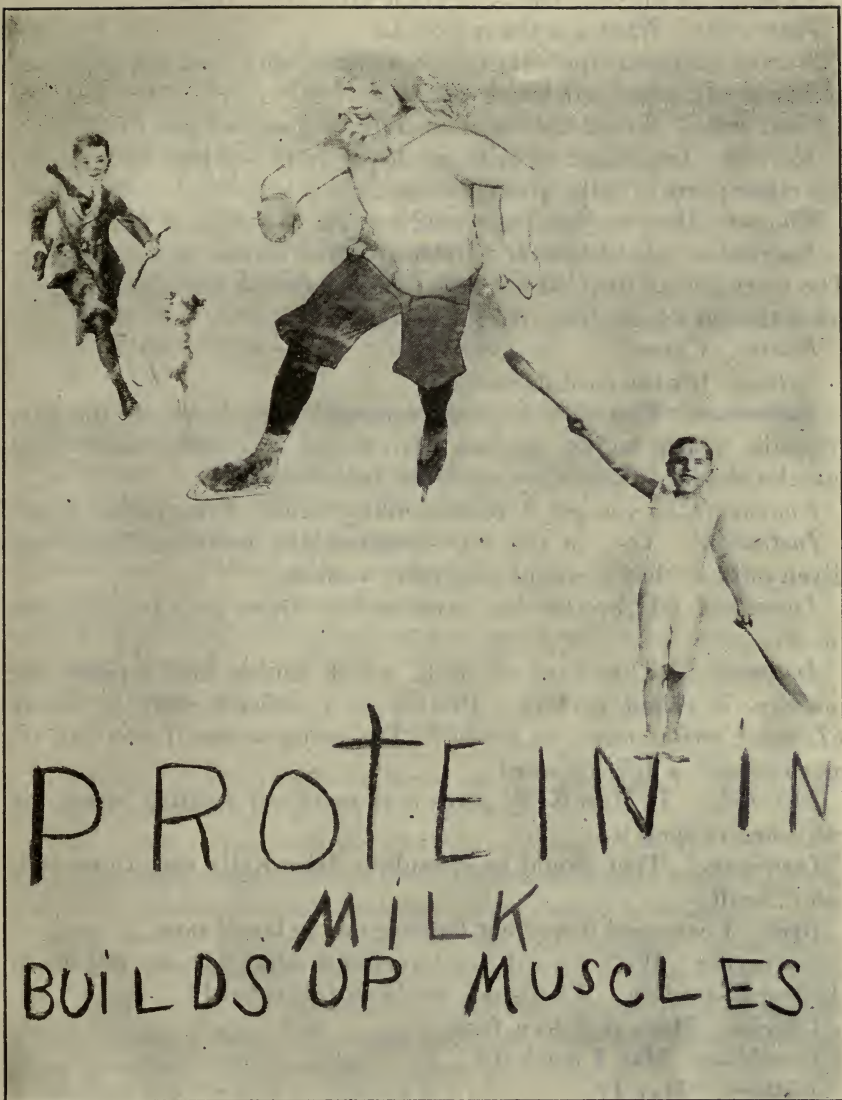
All. Candy.

Instructor. Candy is most all sugar and is good for us, if we don't eat too much, and if we eat it at the right time. If we eat too much it will ferment in our stomachs. When is the best time to eat sweet things?

Mary. My mother won't let me eat any candy except after a meal.

Instructor. Your mother is very wise, Mary. Why does she not allow you to eat candy whenever you choose?

Mary. I don't know.



Poster Made by a Child in Grade III.

Instructor. Did any of you ever eat some candy right before dinner, and then when it came time for your dinner you didn't feel hungry?

Several. Yes, I have—I have!

Instructor. Well, that is because sugar is so quickly digested that you feel satisfied for awhile, but after an hour or so you become very hungry. Sugar alone wouldn't make you healthy; in fact, you couldn't live if you ate sweet things all the time and nothing else. When is the best time for eating sweet things?

Eugene. With your meals, or right after.

Instructor. What are the reasons?

Baxter. So you won't eat so much candy, and then not get other things to eat, which are better for you.

Instructor. Would the sugar in milk be good for you?

Martha. Yes, sugar in milk would be good for you, because you get other parts of milk with the sugar.

Eugene. How much sugar would you get in a glass of milk?

Instructor. A little over a tablespoonful in one measuring cup. The whey has all dripped out now, so let's take the bag down and see what the curd looks like. What is this?

Baxter. Cheese.

Nelson. It's the curd of milk.

Instructor. This curd is very important. It represents the part of milk which builds muscles. Girls and boys who want good muscles should be sure they eat much building food.

Eugene. Can you get it from drinking milk. I don't like cheese.

Instructor. Yes; in the war hospitals the wounded boys were given milk so that it would heal their wounds.

Lawrence. My brother had fever and he drank milk to build him up.

Instructor. This part of milk, which builds and repairs our muscles, is called protein. Protein is a difficult word to learn. (*Teacher writes word on board.*) I'm going to see if you can remember such a difficult word.

Elizabeth. If Miss Kelly gives it to us in our spelling lesson, we can learn to spell it.

Instructor. That would be splendid. Miss Kelly may think it is too difficult.

Bert. I can spell it without looking on the board now.

Instructor. Well, we will see to-morrow what you can tell about the word—protein. What shall we do with this curd?

Charles. Mash it with a fork.

Geraldine. May I mash it?

William. May I?

Instructor. Yes, Geraldine and William may put the curd into a bowl and mash with a silver fork.

William. Don't you put salt in it?

Instructor. Do you think it would be better with salt added?

William. Yes.

Instructor. All right, you add the salt.

Charles. At home we have pepper and cream in the cheese we make.

Instructor. That does improve the cheese, Charles. Suppose you add the cream and pepper. Do your work right here so everyone

can see. What do you think of this cottage cheese as a part of a lunch?

Lawrence. It would be good, because it builds you up.

Instructor. Let's weigh the cheese to see how much two quarts of sour milk will make. (*Teacher demonstrates the weighing. Milton and Mary weigh the cheese.*)

Milton. It weighs about a half of a pound.

Instructor. We will serve our cottage cheese on crackers. (*Several are chosen to spread crackers with cheese; to pass crackers, etc.*)

Martha. May I take mine home?

Instructor. Yes, if you wish to do so. Would it be cheaper to make cottage cheese at home than to buy it?

All. Yes.

Instructor. What would we have to know in order to answer that question correctly?

Lawrence. How much it costs when you buy it.

Richard. How much is milk a quart?

William. It is 40 cents a quart.

Margaret. I think it is only 5 cents.

Martha. I can ask my mother.

Instructor. Shall we find out how much milk and cheese cost for our next lesson?

All. Yes.

Lesson 7.

Instructor. Will someone write on the blackboard the different things we have found milk to contain?

(*All hands. Runcie writes, "Milk contains water."*)

Will someone else write on the blackboard, besides Runcie, how we found out that milk contains these things Runcie is writing?

(*All hands. Nancy writes, "All the water may be taken out of milk and the dry things left. Then water may be added again to the dry things and make milk again." Runcie continues, "Milk contains fat." Nancy writes, "We made butter to show how fat is in milk." Runcie writes, "Milk contains sugar."*)

Nelson, take Nancy's place at the board and write how we found sugar in milk.

(*Nelson writes, "We tasted the way. It was sweet. We saw milk sugar in a box."*)

Charles. He means whey—w-h-e-y.

(*Runcie continues, "Milk contains protein." Nelson writes, "We made cheese from sour milk, and lots of milk protein is in cheese."*)

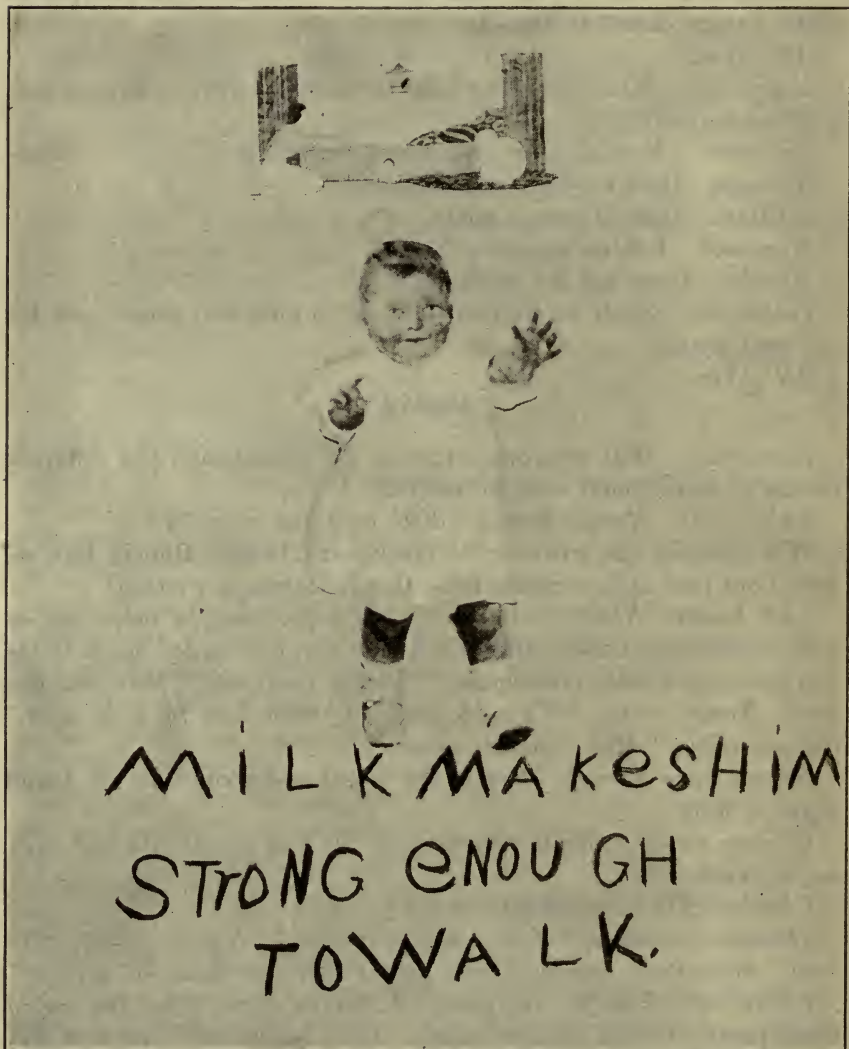
Instructor. That is very good. I wonder if we know the use of these parts of milk in our bodies. Let's begin with the first one Runcie wrote.

Whitworth. The water in milk keeps our body well by keeping our blood moving, and keeping the parts of the body from drying out.

Overton. Water washes the inside of our body as well as the outside.

Nancy. You said it was better to have a dirty face than a dirty stomach. (*Teacher writes the uses of each part of milk in the body as children name them.*)

Instructor. What is the use of eating foods containing fat?



Poster Made by a Child in Grade III.

Amanda. Keep us warm.

Overton. Fat keeps us warm.

George. Fat keeps us healthy.

Milton. Fat keeps us well.

Eleanor. If you don't eat fat in milk you might get sick.

Instructor. Some fatty foods are better for us than others. Butter fat is especially good. What is the use of sugar in the diet?

Helen. Makes us work fast.

Geraldine. Too much sugar will make you sick.

Ann Ross. You should eat candy with your meals, or right after.

Runcie. Sugar keeps you from getting hungry.

Isabel. I save my candy and eat it after my meals now.

Instructor. That is fine. How many of you are being careful about when you eat candy? (*Every hand.*) The next part of milk which Runcie has mentioned is protein. How does protein help us?

Elizabeth. Protein is one of the best parts of milk. It builds muscle.

Richard. Protein makes us fat.

Instructor. We don't get very fat on protein. Fatty foods, sugars, and starchy foods make us fat.

Amanda. We couldn't make sores or cuts better without protein, and we have to get it by eating foods that have protein in them. Milk does.

Robert. We would die without protein.

Instructor. Now let's see, milk contains food materials that build muscles and fat. Is there anything else in the body which needs building up besides muscular tissue and the fatty tissues?

Charles. Foods that build brain.

Instructor. The foods we have mentioned build brain too. All foods that build other parts of the body build brain too. There is something else in our bodies too, which must be nourished especially. If we did not have this something else we would all be little heaps on the floor. (*Deep thinking for several minutes. Two hands upheld.*)

Overton. Bones.

Instructor. Yes. Do you suppose milk can build bones?

Nelson. It must have or babies couldn't get strong enough bones to walk on.

Instructor. How do the bones of a baby compare with yours?

Nancy. They are smaller.

Eleanor. They aren't so stiff.

Instructor. Did you ever see little children with their legs looking like this ()?

Martha. My little cousin's legs are like that.

Instructor. Will you tell us what made them that way, Martha?

Martha. I guess she walked on them before she got enough milk to make them stiff.

Tom. I saw a little boy on our street the other day, and he was just as bowlegged!

Lawrence. Do some foods keep you from being bowlegged?

Instructor. When you are little you need to be sure you have foods which build up the bone.

Mary. I broke a bone in my finger once.

Eugene. Mary should eat milk so her finger would grow back right.

Instructor. One of the college girls took everything out of one cup of milk except mineral; she boiled the water out and then burned the rest of the dried substance, and she had this left. (*Holds up test tube with the ash of milk.*)

Whitworth. Wouldn't that burn, too?

Instructor. No, this would not burn. It is what we call the ash of milk. When you burn coal, or wood, what do you have left?

Mary. Ashes.

Instructor. That is what this is; the part of milk which will not burn—the ash of milk. One of the important parts of this ash is called calcium—c-a-l-c-i-u-m. (*Writes word on board.*) Calcium is one of the main parts of bone. Milk contains lots of calcium, so it can build bone. I will pass this tube of milk ash around so you can see it better.

Sam. Looks like ground bone.

Thomas. Looks like a powder we give our chickens.

Instructor. What other hard tissues do you have in the body besides bone?

Chester. Finger nails are hard.

Amanda. So are toe nails.

Instructor. Anything else? It would be difficult for us to eat if we didn't have this other hard tissue that I am thinking about.

Several. Teeth.

Instructor. Name the hard tissues of the body again, Mary Todd.

Mary. Finger nails, teeth, and bones.

Instructor. Ash not only builds and repairs the hard tissues of the body, but it also aids in keeping all of the organs in good condition. One important mineral, iron, however, is not found in large enough quantity to keep the blood in good condition. Name some foods we can eat with milk which contain this necessary mineral.

Chester. Bread.

Instructor. Bread doesn't contain much iron. Spinach, turnip greens, lettuce, egg yolks, some meats, and fruits contain iron. Spinach has lots of iron.

Nancy. May I write ash on the board under water, fat, sugar, protein?

Instructor. Yes, Nancy, I wish you would. When we made butter I told you something about the use of butter fat, which made butter fat so valuable. Can anyone tell me about that?

Lawrence. You said that in Denmark little children, one time, all had sore eyes, and the doctors found out it was because all the cream was taken out of milk, and the butter then was out.

Instructor. Yes, butter fat contains something which we don't know much about, nobody does, but if you don't get butter fat your eyes get sore, and you don't grow well. I have some pictures here showing some rats. Some of them got butter fat, and some didn't.

Tom. I guess those little ones didn't get any.

Instructor. You are right, Tom. Although these little rats are of the same age and are brothers to these nice fat, big rats, they didn't grow strong and well because they didn't get this property of milk.

Tom. Shall we add that to list on board?

Instructor. Yes, Tom. Will you write it? What shall we say of the use of butter fat?

Geraldine. Makes us grow and be well.

Baxter. Keeps our eyes from getting sore.

Instructor. I have something here which I hope will interest you. This is the third grade's milk chart. Each one of you will have a column of little squares. Under your column will be written your name and your weight. Each day that you drink two glasses of milk you may fill in your square with colored crayon. Each one will have a certain color. It might be pretty to use the rainbow colors—red, orange, yellow, green, blue, and violet.

Eleanor. I want red.

Instructor. You and Miss Kelly can decide about the colors.

William. If I drink only one glass of milk, how would I mark it on the chart?

Runcie. He could fill in half of the square.

Geraldine. Suppose I'd only drink one-half a glass?

Instructor. That is a splendid arithmetic problem. Think about that. Geraldine asks how she would mark the chart if she should drink only one-half a glass.

Tom. She would fill only one-fourth of the square.

George. I drink milk every chance I get now.

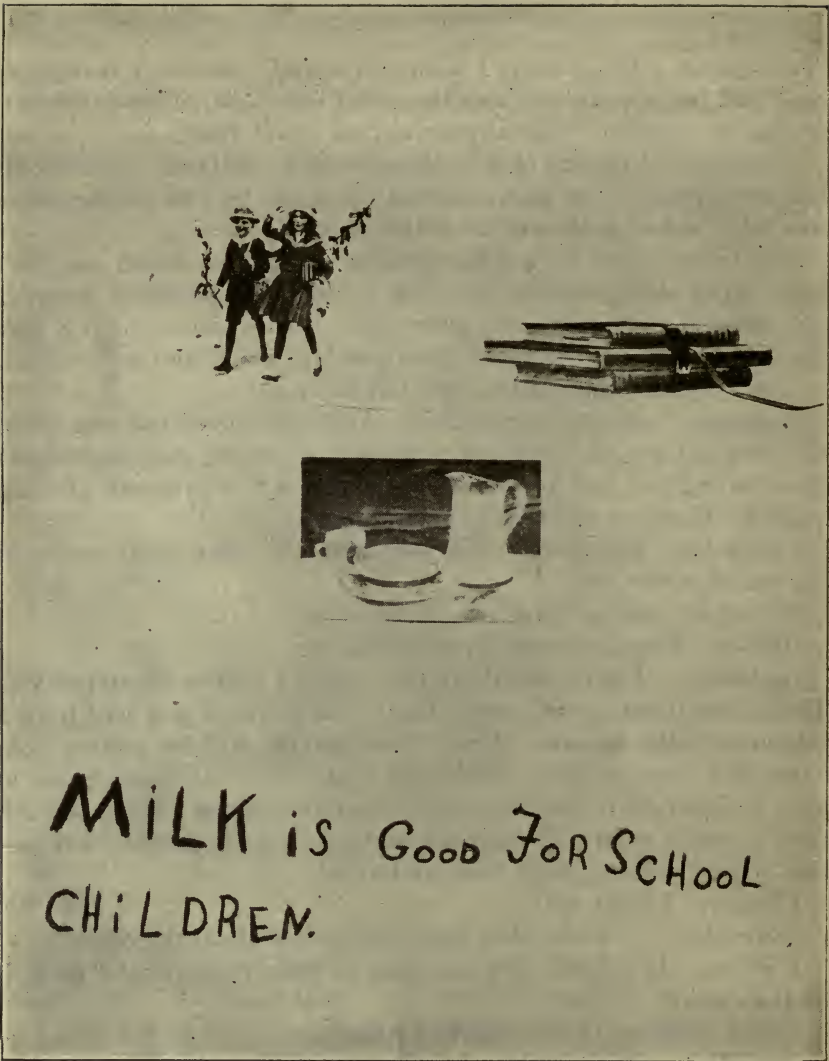
Howard. I used to hate milk, but I like it now.

Charles. Milk used to make me sick, but it doesn't any more.

Amanda. If you drink cocoa, will that count?

Instructor. What does the class think about it?

Eugene. I should think it would, if the cocoa is made of milk.



Poster Made by a Child in Grade III.

Whitworth. Would soup made with milk count?

Instructor. Yes, if you know how much milk is used. I am going to arrange a convenient time for you and Miss Kelly, so that I may weigh all of you tomorrow, then the next day we can start our chart.

Lesson 12.—The Exhibit and Party.

The final lesson was an entertainment which the children themselves planned for their mothers and teachers. Forty guests came

to the "party" and were entertained with milk exhibits, posters, a milk song, a play, and refreshments.

The following exhibits were arranged by the children on tables in different parts of the room:

Food materials equal approximately to 1 pint of milk in the amount of muscle building material—30 walnuts (in shell); 6 medium sized potatoes; 3 eggs; $1\frac{1}{2}$ cups rolled oats (not cooked); 1 cup of rice; 7 slices bread; 32 apples; 2 square inches of cheese.

Food materials equal approximately to 1 pint of milk in the amount of heat and energy-giving power—1 head cabbage; $\frac{1}{2}$ cup sugar; 3 tablespoons butter; $2\frac{1}{2}$ portions beef; 4 eggs; 2 large apples; 4 figs; 4 cups toasted cornflakes.

A glass of milk ($\frac{1}{2}$ pint) with the approximate amount of butter ($\frac{3}{4}$ tablespoon), sugar ($1\frac{1}{3}$ tablespoons), protein ($3\frac{1}{3}$ tablespoons, represented by cottage cheese), mineral ($\frac{1}{8}$ teaspoon), and water ($\frac{3}{4}$ cup) was exhibited by the children, to give a general idea of the composition of the whole milk.

Another table contained the different brands of condensed, evaporated, powdered, and malted milk.

Each child explained the exhibits to his invited guest, in a tour around the room.

On the walls were hung the posters. A poster had been made by each child, who was entirely responsible for ideas, wording, printing, and selection of the pictures used.

After the guests had seen the exhibits and posters, the children sang the following song:

"A milk weed, and a buttercup, and a cowslip," said sweet Mary,
"Are growing in my garden plot, and these I call my dairy."

A little play, arranged by the children, was presented after the song. The play was divided into two parts. The scene was in a doctor's office, the nurse and doctor being in the room. The nurse announced the first patient, a very thin boy, who entered the office in a very weak condition. After diagnosis, the doctor advised the use of milk daily, and asked him to report again in a month. The next patient was a little girl dressed as a young woman, and carrying a sick child (doll). The doctor examined the child and suggested the use of milk, which he explained would help to build the bones, and thus prevent the child from being so bowlegged. He asked the mother to bring the child back in a month.

The second scene was a month later. The first patient entering was a fat, robust boy, who said he was the same boy there a month ago. The doctor could scarcely believe him, as he had changed so very much. He dismissed the boy, after charging him \$10. The second patient was the young child, who had gained remarkably,

and was less bowlegged than before. After charging the mother \$10, the child was dismissed.

The nurse and doctor discussed the marvelous value of milk, and then left the office.

In one corner of the room the children prepared hot cocoa, which they served with buttered saltines to the guests. The children made the butter that was used.

The guests thanked the children for inviting them, and were very appreciative of both the exhibit and the party.



"
AND SANTA
DON'T FORGET THE MILK"

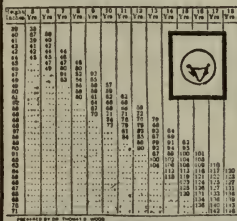
Poster Made by a Child in Grade III.

Class-Room Weight Record



Name	Age	Height	Normal Weight	YEAR											
				Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June		
Edwin H. Allen	10	51 in	62							65	67	65	63		
Raymond Brown	9	42	64							* 69	68	68	70		
Paul C. C. C.	15	61	99							78	76	77	99		
Howard C. C. C.	11	51	75							* 78	80	78	79		
Maxim C. C. C.	11	53 in	68							58	59	60	59		
Katherine C. C.	10	52 in	66							58	61	61	60		
Joseph C. C.	11	54	71							* 75	75	74	74		
Thomas C. C.	12	61	93							87	90	89	90		
John C. C.	11	55	84							116	118	118	125		
George C. C.	11	56	79							* 88	90	89	90		
Robert C. C.	12	56	79							71	71	70	72		
Thomas C. C.	10	56	77							* 77	78	78	80		
Paul C. C.	11	56	77							71	75	72	75		
Tom C. C.	10	57	82							75	76	76	77		
John C. C.	11	56	79							74	74	76	78		
John C. C.	9	52	64							64	65	67	67		
Marion C. C.	10	57	80							81	81	82	84		
Howard C. C.	9	52	64							58	59	59	60		
Oliver C. C.	12	57	83							* 85	85	86	90		
Edward C. C.	12	56	79							71	75	75	96		
John C. C.	13	61	97							112	114	116	116		
William C. C.	9	53	67							64	67	68	70		
Frederic C. C.	11	53	68							68	70	72	73		
Margaret C. C.	11	56	76							* 82	82	83	81		
James C. C.	12	56	81							* 86	89	88	96		
William C. C.	10	55	74							66	67	68	65		
William C. C.	16	62	104							101	108	107	111		
Emma P. B. C.	11	56	76							101	102	104	105		
Paul C. C.	14	62	102							97	98	99	100		

RIGHT HEIGHT and WEIGHT FOR BOYS



ABOUT WHAT A BOY SHOULD GAIN EACH MONTH

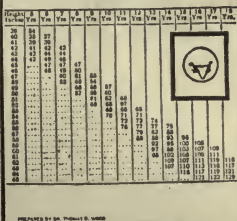
- 5 to 8..... 6 oz.
- 8 to 12..... 8 oz.
- 12 to 16..... 10 oz.
- 16 to 18..... 8 oz.

ABOUT WHAT A GIRL SHOULD GAIN EACH MONTH

- 5 to 8..... 6 oz.
- 8 to 11..... 8 oz.
- 11 to 14..... 12 oz.
- 14 to 16..... 8 oz.
- 16 to 18..... 4 oz.

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RIGHT HEIGHT and WEIGHT FOR GIRLS



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Class-room Work Record



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