Milk and Dairy Food Lecture

I. What is milk?

A. 87% water
B. 13% solids { fat and fat-soluble vitamins it contains and the solids not fat, include carbohydrates, protein, water-soluble vitamins and minerals.
C. **Our most nearly perfect food.**
D. No other single food can substitute for milk in diet and give a person the same nutrients that you get from a glass of milk.
E. Adults 2 cups}
Teenagers 4 cups} per day
Children 3 cups}

II. Nutrients

A. Protein - body building and repair
B. Carbohydrates - energy and warmth
C. Fats - energy and warmth, carries fat-soluble vitamins ADEK
D. Vitamins - Growth, prevents diseases
    1. Vitamin D - bones and teeth, prevents rickets
    2. Vitamin A - aids growth, prevents night blindness
    3. Riboflavin (Vitamin B2) - regulates production of energy from dietary fat, carbohydrates and protein.
E. Minerals - strong bones and teeth, body regulation
    1. Calcium - bones and teeth, prevents osteoporosis
    2. Phosphorus - bones and teeth

III. Shopping pointers

A. Product name
B. Pasteurized
C. Homogenized
D. Ingredients, if any are added
E. Pull date - date on container, indicates that the milk should stay fresh 5 - 7 days after the date stamped on carton

IV. Storage tips

A. Pick up as one of the last items in store
B. **Refrigerate** as soon as possible
C. Use milk in order of purchase from individual refrigerators at home (Put freshest milk in the back and use the oldest first)
D. Chill UHT milk before serving. Refrigerate after opened.
E. Dry milk should be refrigerated after reconstituted
F. Do not pour unused milk back into original container
G. Close container so milk will not absorb flavors
H. Canned milk - store in cool, dry place; rotate and turn cans upside down in storage every few months.
I. Store dry milk in a cool, dry place. Humidity causes milk to lump and may change color and flavor - throw out.
J. Freezing milk changes consistency and not nutritional value. Refrigerate to thaw.

V. Processing of milk

A. Pasteurization - is the process of heating raw milk to at least 145° and holding continuously for at least 30 minutes or to at least 161° and holding for at least 15 seconds in approved and properly operated equipment. The milk is then cooled promptly to 45° or lower. Milk's keeping quality is improved, but nutrient value is not significantly changed.
B. Homogenization - is the process of breaking up milkfat into smaller globules which disperses them permanently in a fine emulsion throughout milk. This done in a homogenizer where milk is forced under high pressure through very tiny openings. Nothing is added or removed. Homogenization results in the formation of a softer curd during digestion.
C. Fortified - is the addition of one or more vitamin (s), minerals (s) or proteins (s) not naturally present in a food. The term, fortified, also applies when added nutrients include one or more naturally present in the food.
D. Ultra-pasteurization - is the process of heating raw milk for two to four seconds at 275 to 300 °, then aseptically packaging it to stay fresh from 60 to 90 days. The product should be kept under refrigeration. After opening it will hold only as long as any other milk.

VI. Forms of Milk

A. Raw milk - fresh, unpasteurized milk straight from the cow.
B. Whole milk - contains not less than 3.25% milkfat. It must contain not less than 8.25% solids-not-fat. Almost all whole milk marketed is also fortified with vitamin D.
C. Lowfat milk - has had sufficient milkfat removed to bring the levels between 0.5 and 2%. It also contains at least 8.25% solids-not-fat. It must contain 2000 IU of vitamin A per quart. Vitamin A is added to offset its loss caused by removal of some o the milkfat. You can find milk in this category labeled:
    1. lowfat
    2. 2 % milk
    3. 1% milk
D. Skim milk - also called nonfat milk, has had sufficient milkfat removed to bring the level to less than 0.5%. It must contain not less than 8.25% solids-not-fat and must be fortified with vitamin A.
E. Chocolate milk - is made by adding chocolate or cocoa and sweetener to 2% milk. It must be fortified with Vitamin A and addition of vitamin D is optional.
F. Eggnog - is a mixture of milk, eggs, sugar and cream. It may also contain added flavorings such as rum extract, nutmeg or vanilla. It's a seasonal product most readily available during the holidays.
G. Nonfat dry milk - is the product obtained by removal of water only from pasteurized skim milk.
H. Buttermilk - is made by adding a special bacterial culture to milk to produce the desirable acidity, body, flavor and aroma characteristic of this product.
I. Evaporated milk - is a canned whole milk concentrate, prepared by evaporating enough water, under vacuum, from fresh whole milk to reduce the volume by half. This concentrate is then homogenized, fortified with vitamin D, packed in cans, sealed and sterilized by heat.
J. Sweetened condensed milk - is a canned whole milk concentrate, prepared by evaporating enough water, under vacuum, from fresh whole milk to reduce the volume by half. It is pasteurized and sugar added to prevent spoilage.
K. Whipping cream - is the fat of whole milk. *Heavy cream* contains a minimum of 36 percent fat, while *light whipping cream* contains 30 to 36 percent fat.
L. Half-and-half - a blend of milk and cream has 10 to 12 percent fat.
M. Sour cream - with 18 percent fat, is cream that has been soured by lactic-acid bacteria.
N. Yogurt - is a milk product with a custardlike consistency. It is made by fermenting partially skimmed milk with special acid-forming bacteria.

VII. Grades of Milk

A. Grade A - has the lowest bacterial count and is the grade sold in retail stores.
B. Grade B - safe and wholesome.
C. Grade C - safe and wholesome.
    1. The grade does not indicate its richness, but applies only to its degree of sanitation.

VIII. Uses of milk

A. Beverage - it requires no preparation other than chilling. It can be served hot or cold with meals, as snacks, and as party foods.
B. Milk as an ingredient - Milk contributes to the nutritive value, flavor, texture, consistency, and browning quality of food products. Milk in all forms can be used as an ingredient in a variety of recipes.

IX. Principles of Milk Cookery

A. Prevent film or scum formation
    1. Using a covered container
    2. Stirring the milk during heating
    3. Beating the mixture with a rotary beater to form a layer of foam on the surface
B. Prevent boiling over
    1. The formation of the film on the boiled milk is the principal reason for the boiling over of milk. A pressure develops under the scum which forces the milk to break through the film and boil over the sides of the pan.
C. Prevent scorching of milk
    1. When milk is heated, some of its protein tends to settle out (coagulate) on the sides and bottom of the pan and can scorch easily unless the milk is heated on a very low heat.
    2. Stirring the milk while it heats helps to thin out the film.
    3. Use a double boiler to avoid scorching.
D. Prevent curdling of milk
    1. When acid is added to milk, the protein settles out in white clumps, or curds, and separates from the whey causing curdling. (Example: acids in tomatoes can cause milk protein to separate as in tomato soup)
    2. Thicken with starch either the milk or the food to be added to the milk. (Example: tomato soup - thicken milk with four and then add the tomato, or thicken the tomato and then add the milk)
    3. Cook at a low temperature
    4. Use very fresh milk (Milk with a high acid content will curdle when heated; acids can develop from improper storage)

X. Milk Substitutes

A. Cheese, ice cream, can replace part of milk in diet - but at added cost and they have more calories
B. Cheese and cottage cheese - larger containers cost less
C. Yogurt and ice cream - cost as much as three times a glass of milk

XI. Stretching the Milk Dollar

A. Buy milk larger than quart size
B. Buy quantity containers
C. Home delivery cost more

D. Use evaporated milk in cooking
E. Nonfat dry milk in cooking and as a beverage

XII. Reducing fat content in recipes calling for mil products

A. Use skim or 2% milk for whole milk
B. Use yogurt for mayonnaise

XIII. Sauces

A. Flavored liquids that have been thickened.
B. Thickeners:
    1. flour
    2. cornstarch
    3. tapioca
    4. eggs
    5. vegetables
C. Most thickeners cannot be added by themselves to hot food. They will cook into lumps.
    1. Add small amount to another food (sugar or cold liquid)
    2. Cook over low heat
    3. Don't overcook (may lose thickening power)
D. White Sauce
    1. By varying its thickness and flavor, the sauce can be used for a variety of things.
    2. The secret to making a smooth white sauce is using the right amount of flour and in the proper blending of the butter and flour. Measure accurately and mix quickly.
        a. thin - vegetable
        b. medium - cheese sauce, casseroles, soups, gravy
        c. thick - croquettes

E. Recipe:

	Medium	**Thin**	**Thick**
butter	2 Tbs.	1 Tbs.	3 Tbs.
flour	2 Tbs.	1 Tbs.	4 Tbs.
salt	¼ tsp.	¼ tsp.	¼ tsp.
pepper	dash	dash	dash
milk	1 cup	1 cup	1 cup

Milk Study Sheet

Name _____Key_____
Test Date _____

Definitions:

Pasteurized milk - ***Raw milk that has been heated to destroy any disease germs***
Homogenized milk – ***Milk that has been pasteurized and mechanically treated to breakup butterfat and distribute them evenly***
Fortified milk – ***Addition of vitamins or minerals or protein not naturally present in food.***
Aseptic (Ultra-pasteurization) milk – ***Heating raw milk at a higher temperature then aseptically packaging it***
Raw milk – ***Fresh, unpasteurized milk straight from the cow***

Whole milk – ***No butterfat removed contains 3 – 4 1/2 % fat***

Skim milk – ***Most of the butterfat removed (<.5% fat)***

Two percent milk – ***Also called lowfat, has sufficient milkfat removed to bring the levels between 0.5 and 2%***
One percent milk – ***Also called lowfat, has sufficient milk fat removed to bring the levels between 0.5 and 1%***
Buttermilk – ***A culture has been added to give its characteristic flavor***

Chocolate milk – ***Chocolate flavoring added to 2% milk***

Evaporated milk – ***Whole milk with 60% of the water removed 1/2 of the water removed***
Eggnog – ***Mixture of milk, eggs, sugar and cream and flavorings***

Dry whole milk – ***Whole milk mechanically treated to remove all the water in powder form***
Nonfat dry milk – ***Milk which has both the fat and water removed. Powder form***

1. What is milk? ***87% water, 1% solids, most near perfect food***

2. Why is milk called the most near perfect food?
   Protein to build and repair; carbohydrates for energy and warmth; fats for energy and warmth, carries fat soluble vitamins; vitamins A and D, B2; minerals – calcium, phosphorus
3. When shopping for milk, what do you look for on the container?
   Name, pasteurized, homogenized, ingredients if added, pull date

4. How do you store and care for milk products?

Refrigerate promptly

5. The three grades of milk are __ ***A*** ___, __ ***B*** ___, and __ ***C*** ___. The grades tell us the milk is ___ ***safe and wholesome***___.
6. The two uses for milk are: a) _____ ***beverage*** _____
   b) _____ ***ingredient in food*** _____
7. When cooking with milk, always remember to __ ***stir constantly*** ___ and _ ***cook at a low temperature*** _. These two things will help to prevent:
   a) ***film or scum formation***
   b) ***boiling over***
   c) ***scorching***
   d) ***curdling of milk***
8. Milk can be **substituted** in the diet by other forms of milk products at an extra added cost and extra calories which include:
   a) ***cheese*** } ***3 times as much as milk***
   b) ***ice cream*** } ***3 times as much as milk***
   c) ***cottage cheese***
   d) ***yogurt***
9. What are some ways one can stretch their milk dollar?
   a) ***larger container***
   b) ***pick up own from store – no home deliveries***
   c) ***use evaporated in cooking***
   d) ***mix dry milk with regular milk***
10. What are some ways to reduce the fat content in recipes that call for milk products?
    Use skim or 2% milk for whole milk. Use yogurt for mayonnaise
11. The date on the milk carton indicates that the milk should stay fresh for _____ ***5 – 7*** _____ days past that date.
12. The secret to making a smooth white sauce is ___***using the right amount of flour and in proper blending of each. Measure accurately and mix quickly*** ____.
    By varying the thickness, the white sauce can be used for a variety of things for example:
    thin: ***sauces for vegetables***
    medium: ***cheese sauce, casseroles, soups, gravy***
    thick: ***croquettes***
14. What is the recipe for a 1 cup medium white sauce? How is it varied to make a thin and a thick?

Medium	**Thin**	**Thick**
2 tbs. butter	***1 tbs. butter***	***3 tbs. butter***
2 tbs. flour	***1 tbs. flour***	***4 tbs. flour***
¼ tsp. salt	***¼ tsp. salt***	***¼ tsp. salt***
dash pepper	***dash pepper***	***dash pepper***
1 cup milk	***1 cup milk***	***1 cup milk***

Nutrients in Milk

Nutrient	Nutrient in Milk	Importance to Body
Mineral	1. Calcium	Builds strong bones and teeth; strengthens body cells; aids in blood clotting; regulates muscles, including the heart; maintains normal nerve functions.
	2. Phosphorus	Strengthens body cells; combines with calcium to make bones and teeth; helps in the oxidation of foods.
Vitamin	1. Vitamin A	Aids vision and growth; helps maintain health of mucous membranes.
	2. Vitamin B2 (riboflavin)	Aids growth; helps maintain health of skin, eyes, and tongue; helps nerve tissues function; helps digestive tract.
	3. Vitamin B1 (thiamin) 4. Niacin	Assists in maintaining normal appetite, a healthy digestive system, and proper nerve function; helps release food energy for the body's use.
	5. Vitamin D	Helps body to use calcium and phosphorus to build strong bones and teeth.
Carbohydrate	Lactose (milk sugar)	Provides energy.
Fat		Provides energy.
Protein		Aids growth; builds muscles; repairs worn or broken tissues.
Water		Contributes to body fluids; regulates body temperature.