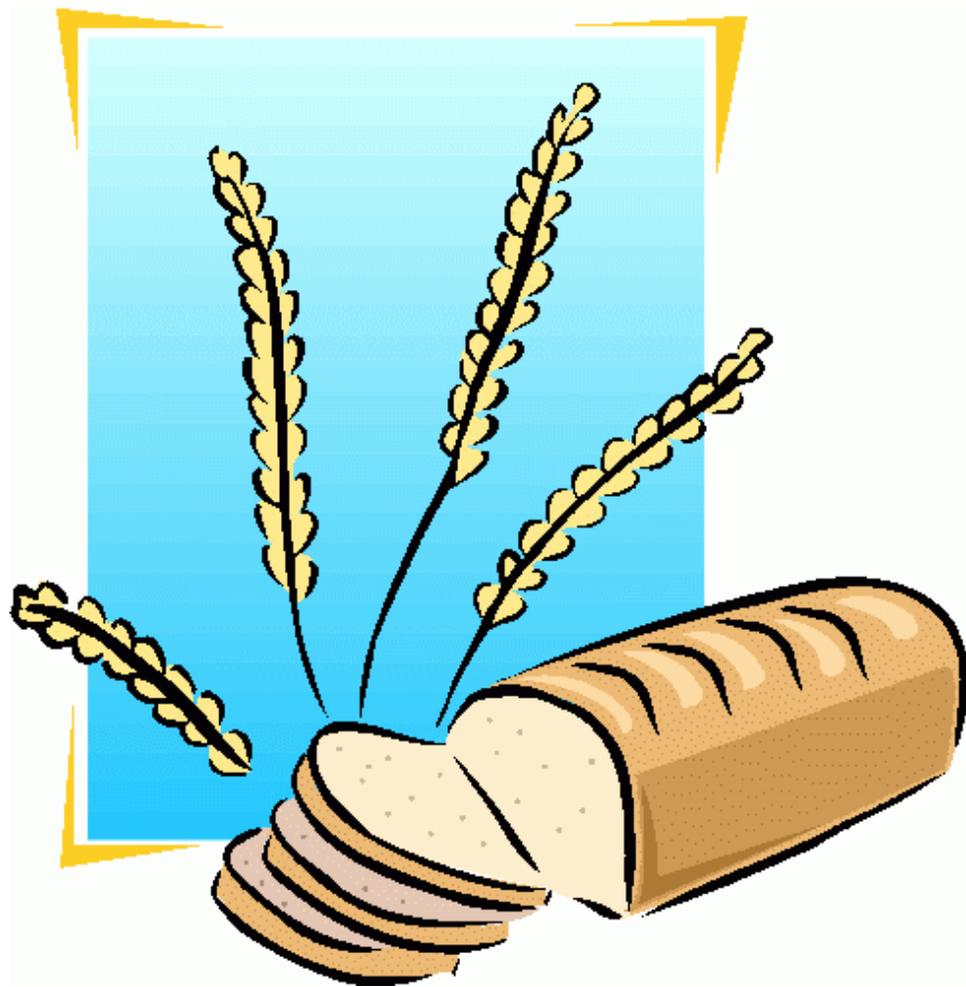


# Unit 3

## Carbohydrates



# Intro to the Six Essential Nutrients

## Intro to Nutrients

1. Nutrients are substances found in food that are essential for \_\_\_\_\_ and \_\_\_\_\_.
2. There are \_\_\_\_\_ basic essential nutrients:
  - Carbohydrates
  - Lipids
  - Protein
  - Vitamins
  - Minerals
  - Water
3. Carbohydrates, Lipids and Proteins each provide \_\_\_\_\_.

## Carbohydrates (Carbs)

1. We get most of our carbs from the \_\_\_\_\_ food group.
2. Almost all of our carbohydrates come from \_\_\_\_\_ food sources.
3. The main function of Carbohydrates is to \_\_\_\_\_.
4. Carbohydrates provide \_\_\_\_\_ calories per gram.
5. If we eat more carbs than our bodies need for energy, they get stored as \_\_\_\_\_.
6. \_\_\_\_\_ are found in grains, fruits, vegetables, legumes and sugar.
7. Carbohydrates can be broken down into three categories:
  - \_\_\_\_\_ Carbs (Sugars)
  - \_\_\_\_\_ Carbs (Starches)
  - \_\_\_\_\_

### Simple Sugars

1. These are broken down and digested very \_\_\_\_\_.
  - Examples:

<b>Simple Sugar</b> Draw the Picture Here
<b>Complex Starch</b> Draw the Picture Here

### Complex Starches

1. These take longer to digest and provide \_\_\_\_\_.
  - Examples:

### Fiber

1. Complex carbohydrate that helps in the \_\_\_\_\_ process.
2. Foods high in fiber include: \_\_\_\_\_ and \_\_\_\_\_ (especially the \_\_\_\_\_ or peels), \_\_\_\_\_ grains, beans/legumes, \_\_\_\_\_ cereals

## Types of Sugar

<u>Sugar</u>	<u>Other Name</u>	<u>Food Sources</u>
	“Blood Sugar”	Fruit, Vegetables, Grains
	“Table Sugar”	Table Sugar, Sugar Cane
	“Fruit Sugar”	Fruit
	“Malt Sugar”	Grains
	“Milk Sugar”	Milk

## Fiber

### Fiber

1. The average American does not get enough \_\_\_\_\_ in their diets.
2. The National Cancer Institute recommends that the average person gets \_\_\_\_\_ of fiber every day.
3. Two other common names for fiber are: \_\_\_\_\_.
4. Fiber is important because it attracts \_\_\_\_\_ to the \_\_\_\_\_ and helps move food through your system faster. You have to have \_\_\_\_\_ along with fiber or it is not as effective.
5. Benefits of fiber include a lowered risk of \_\_\_\_\_, diverticulitis, hemorrhoids, and colon or rectal cancer.

### Two Types of Fiber

1. The two types of fiber and their functions are:
  1. \_\_\_\_\_: Helps to lower total blood cholesterol
  2. \_\_\_\_\_: Helps move food through the body–will NOT digest or dissolve. (Cellulose)
2. Fiber only comes from \_\_\_\_\_ food sources. You cannot get fiber from animal food sources.

### Foods High in Fiber and Ways to Increase Fiber

1. Foods that are high in fiber include:
  - \_\_\_\_\_ (Especially the skins!) • \_\_\_\_\_
  - \_\_\_\_\_ • \_\_\_\_\_
2. Ways to increase fiber in the diet:
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_

## Wheat Kernel

1. Wheat is milled to produce flours that are used in pasta, crackers, cereals and other high fiber foods.
  - a. \_\_\_\_\_: Provides starch and protein
    - This is the LEAST beneficial part.
  - b. \_\_\_\_\_: Provides iron, zinc, “B” vitamins, Vitamin E, unsaturated fatty acids and other trace minerals
    - This the MOST beneficial part.
  - c. \_\_\_\_\_: Provides fiber, vitamins and minerals
2. When a product claims that it is “Whole Wheat” or “Whole Grain”, it must use the \_\_\_\_\_ wheat kernel, or \_\_\_\_\_ parts.
3. Other products, like white bread, usually only use the endosperm which is the \_\_\_\_\_ part of the wheat kernel.
4. **Fortification**: some of the nutrients that were lost in processing are added back into the product.
5. **Enriched**: 10% more of the Daily Value for the nutrient is being added.



## Carbohydrate Experiment

This experiment will help you determine if a food is a simple or a complex carbohydrate. If a food is a simple carb, the iodine will turn a burnish-tan. If a food is a complex carb, the food will turn the iodine a dark, bluish-black. Test each food below to determine if it is a simple or complex carb. Record your results in the box below. Get the iodine solution (1/2 tsp iodine + 1 T water), liquid dropper and foam plate from your teacher. (One each per group.)

1. Put the flour and sugar on your foam plate. Use a dropper to put a few drops of the iodine solution on the flour and the sugar. (Be careful, because iodine can stain your hands, clothing, and kitchen counters.)
  - a. *Sugar is a simple carb. Flour is complex. Compare the other foods to the sugar and flour.*
2. Lay each of the foods below on the plate, leaving plenty of space between the items.
3. Put a few drops of the iodine solution on each of the food items.
4. Record the color each food item changes to and determine which foods are simple and which foods are complex.

Food Sample	Color	Simple or Complex
1 tsp. flour		Complex
1 tsp. sugar		Simple
1 slice apple		
1 tsp. brown rice		
1/4 slice bread		
1 tsp. honey		

1 vanilla wafer		
1/2 marshmallow (outside)		
1/2 marshmallow (inside)		
1 slice green banana		
1 slice ripe banana		
What is your theory about the marshmallows?		
What is your theory about the bananas? Why use ripe bananas for banana bread?		

## Breads

Quick Breads	Yeast Breads
<ul style="list-style-type: none"> <li>• They are _____ or “quick” (less than an hour to bake)</li> <li>• They use baking soda or powder for _____</li> <li>• They do _____ need to rise or proof</li> </ul>	<ul style="list-style-type: none"> <li>• They take _____ to make and bake</li> <li>• They use _____ for leavening</li> <li>• Requires _____ to develop gluten</li> <li>• They need to _____ or proof</li> </ul>
Purposes of ingredients	
Quick Breads	Yeast Breads
_____ : Body/Structure	_____ : Body/Structure
_____ : Makes it rise	_____ : Provides Leavening
_____ : (Baking powder/Baking soda)	_____ : Controls Yeast
_____ : Flavor	_____ : Feeds Yeast
_____ : Browning/Flavor	_____ : Tenderness
_____ : Tenderness/Richness	_____ : Dissolves and activates yeast
_____ : Moisture	_____ : Color, texture and nutrients

## Leavening Agents

1. Leavening agents are substances are used in batters and doughs that cause them to \_\_\_\_\_ or \_\_\_\_\_, usually because \_\_\_\_\_ is produced.
2. \_\_\_\_\_ leavening agents include yeast, baking powder, baking soda, air and eggs.

## Yeast and Baking Soda/Powder

Yeast	Baking Soda/Baking Powder
<ul style="list-style-type: none"> <li>• The liquid used to activate the yeast should be between 115°-125°F.</li> <li>• If the water is too hot, it will kill the yeast. If the water is too cold, the yeast will not activate.</li> <li>• Sugar helps feed the yeast and salt controls the growth of the yeast.</li> <li>• Yeast breads require time to proof or ruse. This is called “_____.”</li> </ul>	<ul style="list-style-type: none"> <li>• These leavening agents require an _____ in order to react or produce CO<sub>2</sub>.</li> <li>• Baking soda must have an acid from an outside source like vinegar, honey or lemon juice.</li> <li>• Baking powder already has a powdered acidic agent mixed in with it. All it needs is moisture to react.</li> <li>• These leavening agents produce a fast or “quick” reaction so the food product that uses them must be baked quickly.</li> </ul>
Common Acids Used In Food to Produce Leavening	
<ul style="list-style-type: none"> <li>• Sour Cream</li> <li>• Sour Milk (Buttermilk)</li> </ul>	<ul style="list-style-type: none"> <li>• Vinegar</li> <li>• Cream of Tartar</li> <li>• Honey</li> <li>• Molasses</li> <li>• Lemon Juice</li> </ul>

## Gluten and Kneading

1. \_\_\_\_\_: when water is mixed with flour, the proteins in the flour give strength and elasticity to batters and doughs. This is usually done by \_\_\_\_\_ or \_\_\_\_\_.
2. \_\_\_\_\_: to work a dough with the palms of the hands to develop gluten.



Types of Quick Breads	
<u>Dough</u> *Requires Kneading*	<u>Batter</u> *Requires Stirring*
<ul style="list-style-type: none"> <li>• Biscuits, Scones, Doughnuts</li> </ul>	<ul style="list-style-type: none"> <li>• Waffles, Pancakes, Muffins</li> </ul>

## Muffin Method of Mixing

1. Combine all dry ingredients together into a bowl.
2. In a separate bowl, blend all of the liquid ingredients, (including fat.)
3. Make a well in your dry ingredient bowl and pour the liquid in the well.
4. Stir until dry ingredients are moistened.



### The Perfect Muffin:

1. Will have a \_\_\_\_\_ top.
2. Will have some, but few, tunnels in the interior.
3. Will be \_\_\_\_\_.

### The Under-Mixed Muffin:

1. Will have low volume.
2. Will have a \_\_\_\_\_.
3. Will be very crumbly.

### The Over-Mixed Muffin:

1. Will have a \_\_\_\_\_.
2. Will be very \_\_\_\_\_.
3. Will have \_\_\_\_\_ in the interior.

## Biscuit Method of Mixing

1. Combine all dry ingredients.
2. Cut-in the fat until there are crumbs.
3. Add the liquid and stir until a dough forms.
4. Knead the dough so gluten will form.
5. Roll out dough until about 3/4" thick. Cut into biscuits with biscuit cutter.
6. Place on a greased cookie sheet.



### The Perfect Biscuit:

1. Will have a flat \_\_\_\_\_.
2. Will have \_\_\_\_\_ sides.
3. Will be flakey with layers

### Two of the most important steps in making biscuits are:

1. \_\_\_\_\_ (To create the layers)
2. \_\_\_\_\_ (To develop gluten)

## Rice

<u>Type</u>	<u>Description</u>
	Short, When cooked it is moist and tender
	Long, When cooked it is light and fluffy
	Short and plump, When cooked it is soft and clings together ("sticky rice")
	Chewy texture, "nut-like" flavor, has the MOST fiber!
	Long, dark and streaky in color, Distinct flavor
	Cooked then dehydrated, Reduces cooking time

## Cooking Rice

1. Use about 2 cups of water for every cup of rice.
2. Bring water to a boil.
3. Add rice and \_\_\_\_\_.
4. Bring water back up to a boil.
5. Reduce heat so rice will just \_\_\_\_\_ for the remainder of the cooking process.
6. Check for doneness; rice should be tender, but firm and there should be no water left.
7. If some water remains, continue cooking, but remove lid.



**1 cup of uncooked rice**

=



**\_\_\_\_\_ cups cooked rice**

**1:3 Ratio**

## Pasta

<u>Type</u>	<u>Description</u>
	Made from scratch from a simple dough, Kneaded then rolled out and cut by hand or with pasta makers/molds
	Dough is pushed through molds and then dried for several days, Can be stored almost indefinitely
	Dry pasta enriched with vegetable products OR Fresh vegetables used in place of dough

## Cooking Pasta

1. Use about 1 quart of water for every 4 oz. of dry pasta.
2. Bring water to a \_\_\_\_\_.
3. Add pasta slowly to boiling water so boiling does not stop.
4. \_\_\_\_\_.
5. Stir pasta frequently while it's cooking.
6. Cook pasta to al dente stage-pasta remains firm to the bite.
7. Drain pasta in a colander.
8. To keep pasta warm, set the colander over a pan or hot water and cover the colander.



**1 cup uncooked pasta**

=



**\_\_\_\_\_ cups cooked pasta**

**1:2 Ratio**