Grade 7: Healthy Eating

Lesson 4: Healthy Eating to Support the Respiratory and Immune Systems

Objectives:

1) Record food intake accurately.
2) Analyze food intake and compare to recommendations.
3) Analyze food intake for presence of antioxidants and probiotics.
4) Identify the key concepts and differences between lactose intolerance and milk allergies.
5) Make recommendations for dealing with lactose intolerance and/or milk allergies.

Materials:

- Food Analysis Chart **(See Figure 1)**
- Daily Servings Graph **(See Figure 2)**
- Healthy Eating to Support the Respiratory and Immune System Student Article **(See Figure 3)**
- Graphic Organizers **(See Figure 4)**
- Choose My Plate Activities Directions **(See Figure 5)**

Activity Summary:

Students will record their food intake for a week to determine if they are eating enough antioxidants, probiotics, and other foods to support their immune and respiratory systems. Students will analyze their food intake and compare it to dietary recommendations. Students will explore the concepts of lactose intolerance and milk allergies, determine how they are different, and learn how to deal with either.

Background Information for the Teacher:

The article below is a reproduction of the student article.

Healthy Eating to Support Your Respiratory and Immune Systems

Your respiratory system and your immune system are linked. What you breathe and how well you breathe directly affects your immune system. The immune system is a complex defense system that protects you against viruses, bacteria, and other organisms. Some organisms can be air-borne, such as viruses and mold. These air-borne organisms enter your body through the respiratory system. Your immune system must then take over and help your body deal with them.

Your diet can either support the functioning of your respiratory and immune systems, or it can cause problems. In general, a diet that is well-balanced and

that includes a good selection of fruits and vegetables will support both the immune system and the respiratory system. Some people may need to reduce certain foods in their diet to assist both their immune and respiratory systems. The sections below explain why this is so and how people with food allergies can eat a healthy diet that will support their immune and respiratory systems.

Fat in the Diet: Some research is finding that diets high in fat slow down the functioning of your immune system. People who are obese have been found to experience more infectious diseases such as colds and flu. Obesity also contributes to serious diseases such as diabetes and heart disease.

Low fat diets, on the other hand, can **increase immune system function**. But as important as a low-fat diet is, your diet should always include healthy fats such as oily fish (salmon and tuna), olive oil, canola oil, and some nuts and seeds. (See the lessons on the cardiovascular system and the brain and nervous systems for more information on healthy fats.) These unsaturated fats, used in moderation, are essential to proper overall health.

It is also interesting that **crash diets** (under 1200 calories a day) **reduce the functioning of the immune system**. Crash diets are definitely NOT GOOD for your health! The key to healthy immune and respiratory function is eating a balanced diet of foods from all the food groups, including healthy fats. (Go to www.choosemyplate.gov for information on the food groups, and recommendations for a healthy, balanced diet.)

Foods to Support Immune Function: Fruits, vegetables and whole grains are very important for healthy immune function. These foods contain **antioxidants**, which **support the immune system by destroying free-radicals.** Free-radicals are unstable molecules which can damage cells. Antioxidants may stabilize free-radicals, which may, in turn, increase resistance to disease. Scientists are currently studying the effects of antioxidants on diseases such as cancer and heart disease.

Some of the most well-known antioxidants are Vitamin A, Vitamin C, Vitamin E, and beta-carotene. Lycopene and anthocyanisides are two antioxidants that are becoming better known as more research is done. You can buy many antioxidants in pill form, but scientists now believe that taking antioxidants in pill form may not work as well as eating lots of fruits and vegetables.

Both the American Heart Association and the National Cancer Institute advise that healthy eating is the best way to get antioxidants. Eating foods rich in antioxidants also provides a range of other nutrients. Sometimes nutrients need to work together, and when you take them in supplement form you may be missing something important. A healthy diet, on the other hand, can supply a range of nutrients in proper balance. **Fresh fruits and vegetables and whole grains are excellent sources of antioxidants**.

Foods High in Antioxidants: Beta-carotene and Vitamin A are found in orange vegetables such as carrots, orange squash, sweet potatoes, and yams. Orange fruits such as apricots, mangos, and cantaloupe also contain both, as does spinach, kale and collards. Your body actually converts beta-carotene to Vitamin A, and any beta-carotene left over after the body has had enough Vitamin A, is used by the body to destroy free-radicals.

Vitamin C is found in citrus fruits such as oranges, grapefruit, lemons, limes, and tangerines. Blueberries, blackberries, raspberries, and pomegranates are also very high in beneficial antioxidants, including Vitamin C. Red and green peppers, broccoli, green leafy vegetables, many berries, raw cabbage and potatoes also have Vitamin C. The body can't store Vitamin C, so it's important to eat foods with Vitamin C every day.

Lycopene: Tomatoes are a primary source of lycopene**.** Other foods containing lycopene are watermelon, guava, papaya, apricots, pink grapefruit, and blood oranges.

Anthocyanosides are found in blueberries, blackberries, raspberries, cherries, pomegranates, cranberries, red grapes, plums, raisins, and prunes. In fact, these dark red and blue fruits are the richest in antioxidants of all fruits and vegetables. Blueberries have the highest antioxidant rating, but all berries and dark red fruits are very good for you.

Vitamin E is found in foods such as nuts, seeds, and whole grains. Wheat germ is also a good source of Vitamin E, as are almonds and other nuts. Other sources of Vitamin E are oily fish such as salmon and tuna, vegetable oils such as corn oil, safflower oil, and soybean oil, as well as tofu, soy milk, mangos, and dark green leafy vegetables.

Foods with Probiotics: Fermented foods, such as yogurt and kefir, may also support the immune system. They contain beneficial bacteria called probiotics that help your digestive system work properly. When you read the label on a yogurt container, you should see *acidophilus, bifidus,* and other probiotics listed. These are the beneficial probiotics found in fermented milk products. Some studies have shown that eating foods containing probiotics can help your immune system fight off infection. People who are allergic to milk products or lactose intolerant can still get probiotics in foods such as soy yogurt or lactose-free supplements. *(See the section below on lactose intolerance and milk allergies.)*

If you include a range of foods in your diet that are high in antioxidants and probiotics you will be supporting both your immune and respiratory systems. Examine your own diet to see if you are eating enough fresh fruits and vegetables, as well as a range of other foods.

Food Sensitivities and Food Allergies

Sometimes people are sensitive to certain foods. They may need to eliminate or reduce those foods in their diets. Eating too much of some foods, such as dairy or wheat products, may overload your system and make it difficult to digest your food properly. Food sensitivities are different than food allergies. It is important to know the difference.

Many people are sensitive to dairy, for example, but few have true milk allergies. Sensitivity to dairy is known as **lactose intolerance**. It can be controlled by reducing the amount of dairy in the diet. Milk allergies, on the other hand, can cause symptoms that could be life-threatening, and milk and all dairy products must be eliminated from the diet.

Lactose intolerance: Lactose is a naturally occurring sugar that is present in milk and products made from milk. There is a lot of talk about lactose intolerance these days, and sometimes you hear people who are lactose intolerant say they are "allergic" to milk. Lactose intolerance and milk allergies are not the same thing. Lactose intolerance happens when the digestive system doesn't produce enough of a certain enzyme to break down the lactose in dairy products. Milk allergies, on the other hand, are a reaction of the immune system.

When you eat something containing lactose your digestive system produces an enzyme called **lactase** to break down the lactose and make it digestible. If you have too much undigested lactose in your system, it can cause gas, stomach cramps, bloating, and diarrhea.

Most people produce less lactase as they get older, and may have increasing difficulty digesting milk products. Young people tend to produce more lactase and have an easier time digesting dairy products. People from certain ethnic groups, such as those of Northern European descent, seem to have an easier time digesting dairy than people of Asian or African descent. This may be because dairy was such an important food source for Northern Europeans that their bodies became genetically programmed to produce more lactase.

Many people who are lactose intolerant handle it by simply reducing the amount of dairy they eat. If you reduce dairy products, be sure to include other foods that will provide calcium, such as soy milk, tofu, dark leafy greens, or juices with calcium added.

Sometimes eating a small amount of dairy in combination with other foods can eliminate the problem. Eating other foods at the same time seems to reduce the impact of the lactose on your system. In addition, some people benefit from eating yogurt or kefir, since the probiotic bacteria helps them digest the lactose more easily.

If you suspect you are lactose intolerant, you can try some of the suggestions given above—but be sure to include enough foods that contain calcium in your diet. You can also consult your physician, who can give you a **hydrogen breath test** to determine if eating dairy changes the amount of hydrogen in your breath. This is an indicator of how well your system is digesting lactose.

For more information on lactose intolerance, suggestions for diet, and an explanation of the hydrogen breath test, go to www.kidshealth.org. Go to the Teen section and look for the article on Lactose Intolerance.

Milk Allergies and Other Food Allergies: People who are allergic to milk have a reaction to one of the proteins found in milk. Allergic reactions involve the immune system**.** People who are lactose intolerant, on the other hand, have difficulty digesting the milk sugar, lactose. Lactose intolerance involves the digestive system**.**

An allergic reaction happens when the **immune system** mistakenly identifies something as an "invader" that poses no problem for most people. When the immune system identifies milk protein as an invader, it responds by producing antibodies that cause the body to go on alert. Histamine and other chemicals are produced that affect major body functions. The respiratory system may react with symptoms such as coughing, wheezing, or an asthma attack. The intestines may react with nausea and vomiting. There may be skin rashes, hives, or headache.

Most allergic reactions are mild, but a few people can have **severe allergic reactions**. A severe allergic reaction can cause the throat to close up and lead to difficulty breathing. People who know they have severe reactions to certain foods may need to carry **epinephrine** with them in case of emergency. If you suspect you have a food allergy, you should **consult a doctor.**

A doctor can run a series of tests to determine what is actually causing the problem. In addition to milk, foods that may cause allergic reactions in certain people are peanuts, shellfish, and wheat.

If you find (with a doctor's help) that you do have a milk allergy, you will need to eliminate milk and all milk products from your diet. Be careful of all packaged foods. You should become very adept at reading labels. You will also need to include foods in your diet that have enough calcium, since that is an important nutrient in milk that is essential to a healthy diet.

For more information on milk allergies, suggestions for diets, and an explanation of the allergy testing, go to www.kidshealth.org. Go to the Teen section and look for the article on Milk Allergies.

Summary: Remember, your diet can either support the functioning of your respiratory and immune systems, or it can cause problems. Eat a variety of foods that include antioxidants such as fruits, vegetables, and whole grains. To get beneficial probiotics such as *acidophilus,* include yogurt or kefir in your diet. If you are lactose intolerant or have a milk allergy, look for milk substitutes. You will need to be sure you include enough calcium in your diet from sources other than dairy products.

Vocabulary:
The vocabulary words *in italics* are optional. These are specific terms that apply to the larger category, and you may wish to simply explain them to students.

antioxidants
- *anthocyanosides*
- *beta-carotene*
- *lycopene*

probiotics
- *acidophilus*
- *bifidus*

lactose

lactase

lactose intolerance
- *hydrogen breath test*

immune system
- *antibodies*
- *histamine*
- *epinephrine*

Engage:
This activity is designed to be conducted across an entire week.

Day 1:

Challenge students to remember everything they ate the day before. Have them write down each meal and all snacks. Then have them categorize the list into food groups:

- fruits
- vegetables
- grains
- milk (dairy)

- meat and beans
- nuts, seeds, and oils
- other foods

Organize students into teams of four to five students. Have them count the number of servings of fruits and vegetables they have as a group. Give a prize to the team that has the highest number.

Tell students they will be keeping a **food diary**. Each day of the week give the students time to write down what they ate the day before. If they can manage to write part of the journal at home, have them do that. Encourage them to include **everything** they eat, whether they think it's healthy or not.

Explore:

Days 2, 3, 4 and 5:

1. If you have Internet access, use the Extend activity below. Have students go to www.choosemyplate.gov and access Get Your MyPlate Plan link: https://www.choosemyplate.gov/resources/MyPlatePlan **.** Each day have students enter what they ate the day before.

    - **Day 2**: Have students explore the site and enter what they ate.
    - **Day 3**: Have students enter what they ate and do the *Explain* activity below.
    - **Day 4**: Have students enter what they ate and investigate the reports.
    - **Day 5**: Have students analyze their diet.

2. Follow the directions provided in the *Extend* section.

3. If you don't have Internet access, have students use the *Food Analysis Chart* **(See Figure 1)**. Have them use their food journals each day, recording each food they ate in the appropriate column. Using a new food analysis sheet for each day of the week, challenge students to keep a graph, showing the number of servings of **fruit**, **vegetables**, and **whole grains** they eat each day. Use the *Daily Servings Graph* provided, or create your own (**see Figure 2**).

4. At the end of the week, have students review their food intake to determine how well they did at including foods that support their respiratory and immune systems.

5. Tell students that they should be getting **four to five servings of vegetable**s **every day** (2 to 2 ½ cups) **and four to five servings of fruit every day** (2 to 2 ½ cups). This may be considerably more than they are currently eating.

6. Also, have students analyze how many of their servings of grains are actually **whole grains.** Whole grains include whole wheat flour (not just wheat flour), brown rice (not white rice), oatmeal, millet, barley, and other grains that are minimally processed. Some packaged cereals such as Grape Nuts and granola are also made from whole grains. Be sure students read the labels and record their food intake accurately.

Explain:

Day 3:

Have students read the article ***Healthy Eating to Support the Respiratory and Immune System*** **(See Figure 3).** Working together in groups to better understand the article, have each group read a different section and record key ideas and foods mentioned in that section. Use the graphic organizers provided below to help organize the information. (These are provided as a separate handout for students. **See Figure 4**)

Introduction	Main Ideas
Respiratory system	
Immune system	
Diet	

Fat in the Diet	Main Ideas
High fat diets	
Low fat diets	
Crash diets (under 1200 calories)	
Healthy fats	

Foods to Support Immune Function	Main Ideas
Important foods	
Antioxidants	
Free-radicals	
How to get antioxidants	

Foods High in Antioxidants and Probiotics	Main Ideas and Food Sources
Beta-carotene	
Vitamin A	
Vitamin C	
Lycopene	
Anthocyanosides	
Vitamin E	
Probiotics	

Lactose Intolerance	Main Ideas
What is lactose?	
What body system is involved in lactose intolerance?	
What is lactase?	
Who might tend to be lactose intolerant?	
What are some ways to deal with lactose intolerance?	

Milk Allergies	Main Ideas
What system is involved in allergic reactions?	
How is a milk allergy different from lactose intolerance?	
What happens in an allergic reaction?	
Who should you consult if you think you might have a food allergy?	
What will you need to do if you have a milk allergy?	

Extend:

1. Use the student directions and worksheets provided as separate handouts. They are reproduced below for reference **(see Figure 5)** If you have time, it is helpful to do this activity yourself before introducing it to the students.

2. Directions for Students:
   - Go to www.choosemyplate.gov
   - Select Get Your MyPlate Plan link: https://www.choosemyplate.gov/resources/MyPlatePlan
3. Select ***Assess Your Food Intake***
   - At the ***log in*** screen, follow the instructions to create a user name and password for yourself.

4. Create your personal profile. You do **not** need to give your e-mail or zip code information. **Do** fill in your age, gender, height and weight. This will help the tracker calculate your optimal food and exercise levels.

5. Click ***Proceed to Food Intake.*** Use your food journal to enter everything you ate yesterday. You will need to search for the foods on your list using the textbox and the search function. After you have located a food, click it to add it to your list for the day.

6. Once you have a full day of eating in the program, go to ***Analyze Your Food Intake.*** Click the various reports on this page to see how your diet compares to the dietary guidelines. Use the charts below to analyze your own food intake.

7. Click the following reports and note the specific information asked for below. Fill in the charts with your own information.

Calculate DG Comparison

Food Category	Number of Servings	OK/Too Little/Too Much
Grain		
Vegetable		
Fruit		
Milk		
Meat and Beans		
Total Fat		
Saturated Fat		

Nutrient Intake

Nutrient	Amount	Recommended Daily Intake
Vitamin A		
Vitamin C		
Calcium		

Enter food information **every day** for a week, checking your food intake against the recommendations. Pay particular attention to your consumption of fruits and vegetables. Also, closely monitor your intake of foods that supply **antioxidants.** This will tell you if you are getting the proper nutrition to support your immune system.

Check to see if you are getting enough (but not too much) fat. If you are lactose intolerant or have any food allergies, check to be sure you are eating from the food groups according to your own needs. You may also wish to track your physical activity to see how your food intake and physical activity work together.

Evaluate:
Have students use the information they have gathered to answer the questions below. Have them support their answers with specifics from your food journal and analysis.

1. In general, are you eating enough?
2. Are you eating too much of some foods?
3. Which foods do you eat too much?
4. Which foods should you eat more?
5. How would you rate your diet overall?

Missouri Standards:
Health and Physical Education Frameworks
II. Health Maintenance and Enhancement
B. Nutrition Principles and Practices

What All Students Should Know:
1. Vitamins and minerals help to release energy and help the body to perform many functions including fighting infections.
What All Students Should Be Able To Do:
b. Identify food sources that supply each of the essential nutrients.

What All Students Should Know:

3. Choose My Plate is a visual representation of daily nutrient needs and the food groupings that can provide them.
What All Students Should Be Able To Do:
a. Organize foods into groups with similar nutrient composition.

What All Students Should Know:
5. Balance, moderation and variety are important concepts to be considered when making food choices.
What All Students Should Be Able To Do:
a. Make informed decisions regarding food choices based on an understanding of balance, moderation, and variety.

Figure 1

Food Analysis Chart

Figure 2

Daily Servings Graph

Figure 3:

Healthy Eating to Support the Respiratory and Immune System

Introduction:

Your respiratory system and your immune system are linked. What you breathe and how well you breathe directly affects your immune system. The immune system is a complex defense system that protects you against viruses, bacteria, and other organisms. Some organisms can be air-borne, such as viruses and mold. These air-borne organisms enter your body through the respiratory system. Your immune system must then take over and help your body deal with them.

Your diet can either support the functioning of your respiratory and immune systems, or it can cause problems. In general, a diet that is well-balanced, and that includes a good selection of **fruits and vegetables**, will support both the immune system and the respiratory system. Some people may need to reduce certain foods in their diet to assist both their immune and respiratory systems. The sections below explain why this is so and how people with food allergies can eat a healthy diet that will support their immune and respiratory systems.

Fat in the Diet

Some research indicates that **diets high in fat slow down the functioning of your immune system**. People who are obese have been found to experience more infectious diseases such as colds and flu. Obesity also contributes to serious diseases such as diabetes and heart disease.

Low fat diets, on the other hand, can **increase immune system function**. However, as important as a low-fat diet is, your diet should always include healthy fats such as oily fish (salmon and tuna), olive oil, canola oil, and some nuts and seeds. (See the lessons on the cardiovascular system and the brain and nervous system for more information on healthy fats.) These unsaturated fats, used in moderation, are essential to proper overall health.

It is also interesting that **crash diets** (**under 1200 calories a day) reduce the functioning of the immune system**. Crash diets are definitely not good for your health! The key to healthy immune and respiratory function is eating a balanced diet of foods from all the food groups, including healthy fats. (For more information on the food groups and recommendations for a healthy, balanced diet, go to www.choosemyplate.gov.

Foods That Support Immune Function

Fruits, vegetables and whole grains are very important for healthy immune function. These foods contain **antioxidants,** which are important for immune system function. Antioxidants support the immune system by destroying **free-radicals.** Free-radicals are unstable molecules which can damage cells. Antioxidants may stabilize free-radicals which may, in turn, increase resistance to disease. Scientists have been studying the effects of antioxidants on diseases such as cancer and heart disease

Some of the most well-known antioxidants are *Vitamin A, Vitamin C, Vitamin E,* and *beta-carotene. Lycopene* and *anthocyanisides* are two antioxidants that are becoming better known as more research is done. You can buy many antioxidants in pill form, but scientists now believe that pill antioxidants may not work as well as eating lots of fruits and vegetables.

Both The American Heart Association and the National Cancer Institute advise that healthy eating is the best way to get antioxidants. Eating foods rich in anti-oxidants also provides a range of other nutrients. Sometimes nutrients need to work together, and when you take them in pill form you can be missing something important. A healthy diet, on the other hand, can supply a range of nutrients in a proper balance. **Fresh fruits and vegetables** and **whole grains** are excellent sources of antioxidants.

Foods High in Antioxidants

Beta-carotene and **Vitamin A** are found in orange vegetables such as carrots, orange squash, sweet potatoes, and yams. Orange fruits such as apricots, mangos, and cantaloupe also contain both, as do spinach, kale and collards. Your body actually converts beta-carotene to Vitamin A. Any beta-carotene left over after the body has had enough Vitamin A is used by the body to destroy free-radicals.

Vitamin C is found in citrus fruits such as oranges, grapefruit, lemons, limes, and tangerines. Blueberries, blackberries, raspberries, and pomegranates all are very high in beneficial antioxidants, including Vitamin C. Red and green peppers, broccoli, green leafy vegetables, many berries, raw cabbage and potatoes also have Vitamin C. The body can't store Vitamin C, so it's important to eat foods with Vitamin C every day.

Tomatoes are a primary source of **lycopene.** Other foods containing lycopene are watermelon, guava, papaya, apricots, pink grapefruit, and blood oranges.

Anthocyanosides are found in blueberries, blackberries, raspberries, cherries, pomegranates, cranberries, red grapes, plums, raisins, and prunes. In fact, these dark red and blue fruits are the richest in antioxidants of all fruits and vegetables. Blueberries have the highest antioxidant rating, but all berries and dark red fruits are very good for you.

Vitamin E is found in foods such as nuts, seeds, and whole grains. Wheat germ is another good source of Vitamin E, as are almonds and other nuts. Other sources of Vitamin E are oily fish such as salmon and tuna, vegetable oils such as corn oil, safflower oil, and soybean oil, as well as tofu, soy milk, mangos, and dark green leafy vegetables.

Foods with Probiotics

Fermented foods such as yogurt and kefir may also support the immune system. They contain beneficial bacteria called **probiotics** that help your digestive system work properly. When you read the label on a yogurt container, you should see *acidophilus, bifidus,* and other probiotics listed. These are the beneficial probiotics found in fermented milk products. Some studies have shown that eating foods containing probiotics can help your immune system fight off infection. People who are allergic to milk products or lactose intolerant can still get probiotics in foods such as soy yogurt or lactose-free supplements. (See the section below on lactose intolerance and milk allergies.)

If you include a range of foods in your diet that are high in **antioxidants** and **probiotics** you will be supporting both your immune and respiratory systems. Examine your own diet to see if you are eating enough fresh fruits and vegetables, as well as a range of other foods.

Food Sensitivities and Food Allergies

Sometimes people become sensitive to certain food and may need to eliminate or reduce those foods in their diet. Eating too much of some foods, such as dairy or wheat products, may overload your system and make it difficult to digest your food properly. Food sensitivities are different from food allergies. It is important to know the difference.

Many people are sensitive to dairy, for example, but few have true milk allergies. Sensitivity to dairy is known as **lactose intolerance**. It can be controlled by reducing the amount of dairy in the diet. Milk allergies, on the other hand, can cause symptoms that could be life-threatening, in which case milk and all dairy products must be eliminated from the diet.

Lactose Intolerance

Lactose is actually a natural sugar that is present in milk and products made from milk. There is a lot of talk about lactose intolerance these days, and sometimes you hear people who are lactose intolerant say they are “allergic” to milk. Lactose intolerance and milk allergies are NOT the same thing. Lactose intolerance happens when the **digestive system** doesn’t produce enough of a certain enzyme to break down the lactose in dairy products. Milk allergies, on the other hand, are a reaction of the **immune system**.

When you eat something containing lactose your digestive system produces an enzyme called **lactase** to break down the lactose and make it digestible. If you have too much undigested lactose in your system, it can cause gas, stomach cramps, bloating, and diarrhea.

Most people produce less lactase as they get older, and may experience increasing difficulty digesting milk products. Young people tend to produce more lactase and have an easier time digesting dairy products. People from certain ethnic groups such as those of Northern European descent, seem to have an easier time digesting dairy than people of Asian or African descent. This may be because dairy was such an important food source for Northern Europeans that their bodies became genetically programmed to produce more lactase.

Many people who are lactose intolerant handle it by simply reducing the amount of dairy they eat. If you reduce dairy products, be sure to include other foods that will provide calcium, such as soy milk, tofu, dark leafy greens, or juices with calcium added.

Sometimes eating a small amount of dairy **in combination with** other foods can eliminate the problem. Eating other foods at the same time seems to reduce the impact of the lactose on your system. In addition, some people benefit from eating yogurt or kefir since the probiotic bacteria helps them digest the lactose more easily.

If you suspect you are lactose intolerant, you can try some of the suggestions given above, but be sure to include enough foods that contain **calcium** in your diet. You can also consult a doctor about giving you a **hydrogen breath test** to determine if eating dairy changes the amount of hydrogen in your breath. This is an indicator of how well your system digests lactose.

For more information on lactose intolerance, diet suggestions, and an explanation of the hydrogen breath test, go to www.kidshealth.org and click on the ***Teen*** section and look for the article on ***Lactose Intolerance***.

Milk Allergies and Other Food Allergies

People who are allergic to milk have a reaction to one of the **proteins** found in milk. Allergic reactions involve the **immune system,** while people who are lactose intolerant have difficulty digesting the milk sugar lactose. Lactose intolerance involves the **digestive system.**

An allergic reaction results from the **immune system** mistakenly identifying something as an "invader" that poses no problem for most people. When the immune system identifies a milk protein as an invader, it responds by producing **antibodies** that cause the body to go on alert. **Histamine** and other chemicals are produced that affect major body functions. The respiratory system may react with symptoms such as coughing, wheezing, or an asthma attack, while the intestines may react with nausea and vomiting. There may also be skin rashes, hives, or headache.

Most allergic reactions are mild, but a few people can have severe allergic reactions, causing the throat to close up and leading to difficulty breathing. People who know they have severe reactions to certain foods may need to carry **epinephrine** with them in case of an emergency.

If you suspect you have a food allergy, you should **consult a doctor,** who can run a series of tests to determine what is actually causing the allergic reaction. In addition to milk, foods that may cause allergic reactions in certain people are peanuts, shellfish, and wheat.

With a doctor's help, if you find with that you have a milk allergy you will need to eliminate milk and all milk products from your diet. Be careful of all packaged foods. You will need to become very adept at reading labels. You will also need to include foods in your diet that contain enough calcium, since that is an important nutrient in milk that is essential to a healthy diet.

For more information on milk allergies, suggestions for diet, and an explanation of allergy testing, go to www.kidshealth.org. Click on the ***Teen*** section and look for the article on ***Milk Allergies***.

Summary

Remember, your diet can either help support the functioning of your respiratory and immune systems, or it can cause problems. Begin by eating a variety of foods that include **antioxidants** such as **fruits, vegetables,** and **whole grains**. To get beneficial **probiotics** such as *acidophilus* include yogurt or kefir in your

diet. If you are lactose intolerant or have a milk allergy look for milk substitutes, but be sure you include enough **calcium** in your diet.

Figure 4: Graphic Organizers

Healthy Eating to Support the Respiratory and Immune Systems

Introduction	Main Ideas
Respiratory system	
Immune system	
Diet	

Fat in the Diet	Main Ideas
High fat diets	
Low fat diets	
Crash diets (under 1200 calories)	
Healthy fats	

Foods to Support Immune Function	Main Ideas
Important foods	
Antioxidants	
Free-radicals	
How to get antioxidants	

Foods High in Antioxidants and Probiotics	Main Ideas and Food Sources
Beta-carotene	
Vitamin A	
Vitamin C	
Lycopene	
Anthocyanosides	
Vitamin E	
Probiotics	

Lactose Intolerance	**Key Concepts**
What is lactose?	
What body system is involved in lactose intolerance?	
What is lactase?	
Who might tend to be lactose intolerant?	
What are some ways to deal with lactose intolerance?	

Milk Allergies	Key concepts
What system is involved in allergic reactions?	
How is milk allergy different from lactose intolerance?	
What happens in an allergic reaction?	
Who should you consult if you think you might have a food allergy?	
What will you need to do if you have a milk allergy?	

Figure 5

Directions for Students:

1. Go to www.choosemyplate.gov and Select." Get Your MyPlate Plan link: https://www.choosemyplate.gov/resources/MyPlatePlan

2. Select "Assess Your Food Intake." At the **log in** screen, follow the instructions to create a user name and password for yourself.

3. Create your **personal profile**. You do **not** need to give your e-mail or zip code information. **Do** fill in your age, gender, height and weight. This will help the tracker calculate your optimal food and exercise levels.

4. Click "Proceed to Food Intake." Use your food journal to enter everything you ate the day before. You will need to search for the foods on your list using the textbox and the search function. After you have located a food, click it to add it to your list for the day.

5. Once you have a full day of eating in the program, go to **Analyze Your Food Intake.** Click the various reports on this page to see how your diet compares to the dietary guidelines. Use the charts below to analyze your own food intake.

6. Click the following reports and note the specific information asked for below. Fill in the charts with your own information.

Calculate DG Comparison

Food Category	Number of Servings	OK, Too Little, Too Much
Grain		
Vegetable		
Fruit		
Milk		
Meat and Beans		
Total Fat		
Saturated Fat		

Nutrient Intake

Antioxidant	Amount	Recommended Daily Intake
Vitamin A		
Vitamin C		
Calcium		

7. Every day for a week enter food information from the day before every day for a week. Check your food intake against the recommendations. See how you are doing in eating enough servings of **fruits and vegetables.** Also check to see how you are doing in eating foods that supply **antioxidants.** This will tell you if you are getting proper nutrition to support your immune system.

8. Check to see if you are getting enough, but not too much fat. If you are lactose intolerant or have any food allergies, check to be sure you are eating from the food groups according to your own needs. You may also wish to track your physical activity to see how your food intake and physical activity are working together.

9. Use your information to answer the questions below:

    - **In general, are you eating enough?**

    - **Are you eating too much of some foods?**

    - **Which foods do you eat too much?**

    - **Which foods should you eat more?**

    - **How would you rate your diet overall?**