



## DAIRY NUTRITION

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Milk and dairy products provide energy and vitamins and minerals to help maintain good health and support essential growth and development. Consumption of dairy products as part of the daily diet is advocated as part of the Dietary Guidelines for Americans, which recommends that people nine years of age and older consume three servings of low-fat or fat-free dairy every day. An eight-ounce glass of whole milk contains about 160 calories and skim milk has just 90 calories. Milk is 87% water, 4.9% lactose, 3.5% protein, 3.5% fat and 1% minerals and vitamins.

### Nine Essential Nutrients

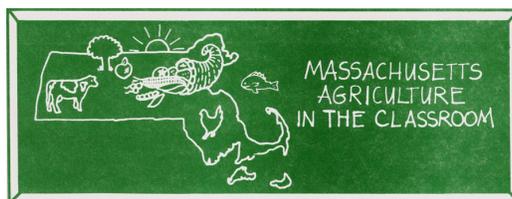
Milk and dairy products contain nine essential nutrients and provide a quick and easy way of supplying these nutrients with relatively few calories. **These nine essential nutrients are: protein, calcium, potassium, vitamin A, vitamin D, niacin, riboflavin, vitamin B12 and phosphorus.**

**Protein:** Adequate protein is important to maintain your muscles, balance fluids and build, maintain and repair tissues. It is important to have a balance between protein and calcium intake, because a high protein diet can cause calcium loss. Milk supplies this balance. The Recommended Daily Allowance of protein is 19 grams for children aged 4 to 8 years old and 34 grams for children aged 9 to 13 years old. One cup of whole milk contains approximately 7.69 grams of protein and a cup of low-fat milk contains 8.05 grams of protein. In addition to dairy products, other good sources of protein include: meats, poultry, fish, tofu, eggs, nuts, seeds and some grains.

**Calcium** is the most abundant mineral in the body and is stored in the bones and teeth where it supports their structure and function. Increased calcium intake will help lower the risk of osteoporosis, promote colon health and may help maintain a healthy weight. Calcium also plays a critical part in muscle contraction, nerve function, heartbeat regulation, healthy blood pressure and clotting of blood as well as hormone secretion. The Recommended Daily Allowance of calcium is approximately 1,000 mg. for children aged 4 to 8 years old and 1,300 mg. for children aged 9 to 13 years old. Milk and other dairy products are good sources of calcium; they naturally offer the most calcium per serving. In fact, one cup of milk (skim, low fat or whole) provides 300 mg. of calcium. In addition to dairy products such as milk, yogurt and cheese, other good sources of calcium include sardines, tofu, soymilk, legumes, some green leafy vegetables, broccoli and calcium-fortified orange juice.

\* Dairy Lesson supported by a grant from the Massachusetts Dairy Promotion Board





**Potassium** is a necessary mineral that serves as an electrolyte, helping to maintain healthy blood pressure, functioning in nerve impulses and muscle contractions including in the heart. It works with sodium to regulate the body's water balance. The Recommended Daily Allowance of potassium is approximately 3,800 mg. for children aged 4 to 8 years old and 4,500 mg. for children aged 9 to 13 years old. One cup of milk (skim, low fat or whole) provides 290 mg. of potassium. In addition to dairy products, other good sources of potassium include nuts, beans, fruits, vegetables, chicken, fish and salt.

**Vitamin A** is vital for good vision. It also regulates the immune system and protects against infections. It is an antioxidant that protects us from free radicals that are linked to premature aging and disease. There are two forms of Vitamin A, one found in animal products and the other found in plants. Both are necessary components of the human diet. The Recommended Daily Allowance of Vitamin A is approximately 400 micrograms for children aged 4 to 8 years old and 600 micrograms for children aged 9 to 13 years old. One cup of fortified milk (skim, low fat or whole) provides 149 micrograms of Vitamin A. In addition to fortified dairy products, other good sources of Vitamin A are eggs, fish oil and liver as well as dark green leafy vegetables and red, yellow and orange vegetables.

**Vitamin D** is a fat-soluble vitamin that is naturally present in very few foods and added to others. It is one of the key nutrients found in dairy. It is important, in conjunction with calcium, for strong teeth and bones because it promotes the absorption of calcium and phosphorus and helps deposit them on the teeth and bones. Vitamin D also regulates cell growth, plays a role in immunity and reduction of inflammation. The Recommended Daily Allowance of Vitamin D for those aged 1 to 70 is 15 micrograms. Vitamin D is provided in fortified dairy products. One cup of fortified milk (skim, low fat or whole) provides 5 micrograms of Vitamin D. Vitamin D is also synthesized by the skin in the presence of the ultraviolet rays of the sun, and is found in salmon (with bones), tuna, mackerel, fish oil and fortified orange juice and cereals.

**Vitamin B3 (niacin)** Niacin plays an important role in removing toxic and harmful chemicals from the body. It also helps the body make various hormones in the adrenal glands and other parts of the body. Niacin helps maintain the central nervous system and is also effective in improving circulation and reducing cholesterol levels in the blood. It also helps maintain a healthy skin, tongue and digestive system. Niacin requirements can be partially met by eating foods containing protein because the human body is able to convert tryptophan, an amino acid in protein, into niacin. The Recommended Daily Allowance of Vitamin B3 is approximately 8 mg. for children aged 4 to 8 years old and 12 mg. for children aged 9 to 13 years old. One cup of low fat milk provides .2 mg of Vitamin B3 (niacin). In addition to dairy products, good sources of Vitamin B3 are eggs, fish, poultry and meat.

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## Nutrition Facts

Serving Size 8 fl oz (240 ml)  
Servings Per Container 8

### Amount Per Serving

**Calories** 100    Calories from Fat 20

**% Daily Value\***

**Total Fat** 2.5g    **4%**

Saturated Fat 1.5g    **8%**

**Cholesterol** 10mg    **3%**

**Sodium** 130mg    **5%**

**Total Carbohydrate** 12g    **4%**

Dietary Fiber 0g    **0%**

Sugars 11g

**Protein** 8g

Vitamin A 10%    •    Vitamin C 4%

Calcium 30%    •    Iron 0%

Vitamin D 25%

\* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Ingredients: Lowfat milk, **vitamin A palmitate**, **vitamin D<sub>3</sub>**





**Vitamin B2 (riboflavin)** helps convert food into energy and metabolizes sugar and fatty acids. It changes the amino acid tryptophan into niacin. It is important for healthy skin, nails and hair. The Recommended Daily Allowance of riboflavin is approximately .6 mg for children aged 4 to 8 years old and .9 mg. for children aged 9 to 13 years old. One cup of low fat milk provides .18 mg of riboflavin. In addition to dairy products such as milk and yogurt, good sources of riboflavin are eggs, liver, enriched grains and green leafy vegetables.



**Vitamin B12** works with folate to make healthy red blood cells. It is also important for neurological function and DNA synthesis. It is used in many cells and body chemicals and helps the body use fatty acids. The Recommended Daily Allowance of Vitamin B12 is approximately 1.2 micrograms for children aged 4 to 8 years old and 1.8 micrograms for children aged 9 to 13 years old. One cup of low fat milk provides 1.2 micrograms of Vitamin B12. In addition to dairy products, good sources of Vitamin B12 are eggs, poultry, fish and meat.

**Phosphorus** is present in every cell in the body and is important in all chemical reactions in the body. It regulates energy metabolism and is also a component of teeth and bones. It is part of nucleic acid (DNA and RNA) and responsible for cell growth and repair. Vitamin D is needed to promote the absorption of phosphorus. The Recommended Daily Allowance of phosphorus is approximately 500 mg. for children aged 4 to 8 years old and 1,250 mg. for children aged 9 to 13 years old. Phosphorus is found in almost all foods, especially protein rich foods such as dairy. One cup of milk (skim, low fat or whole) provides 232 mg. of phosphorus.

While not one of the Nine Essential Nutrients, dairy products also provide the mineral Magnesium. **Magnesium** is part of 300 different enzymes that regulate diverse body functions including protein synthesis, muscle and nerve function, blood glucose control and blood pressure. It is required for energy production. The Recommended Daily Allowance of magnesium is approximately 130 mg. for children aged 4 to 8 years old and 240 mg. for children aged 9 to 13 years old. One cup of milk (low fat) provides 26.8 mg. of magnesium. In addition to dairy products, magnesium is naturally present in many plant and animal foods including green leafy vegetables, legumes, nuts, seeds and whole grains.

### Why Are Vitamins and Minerals?

\* **Vitamins** are organic compounds that are required by the body in very small amounts for human health and essential bodily functions. They have no calories, so thus generate no energy. We get vitamins by eating the plants or animals that make or store these compounds. Some foods have more vitamins than others. Vitamins fall into two categories: fat soluble and water soluble. The fat-soluble vitamins (A, D, E, and K) dissolve in fat and can be stored in your body. The water-soluble vitamins (C and the B-complex vitamins) need to dissolve in water before your body can absorb them. The body can't store these vitamins, any not used pass through your system and is lost. The main Vitamins contained in dairy are A, D, and the B Vitamins - niacin, riboflavin and B12.



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**Minerals** are inorganic materials. Plants absorb minerals from the ground. Animals take in these minerals when they eat plants. Minerals regulate body processes and give structure to bones, muscles and organs. They have no calories and cannot be destroyed by heat. Some foods have more minerals than others. The major minerals are calcium, phosphorus, magnesium and electrolytes such as sodium, chloride and potassium. The trace minerals are chromium, copper, fluoride, iodine, iron, manganese, selenium and zinc. The main mineral nutrients contained in dairy are: calcium, phosphorous, potassium and magnesium.

## Health Rewards of Dairy

**Strong Bones:** Milk and other dairy products provide calcium, vitamin A and vitamin D which work together to help build and maintain bone density. Numerous studies shows that milk can also help reduce the risk of developing osteoporosis later in life.

**Healthy Teeth:** Dairy products contain calcium and other nutrients which help teeth grow and stay healthy. Milk is the only drink, excluding water, which is recommended by dentists as safe to consume between meals. In fact, since milk contains a high percentage of water, it is a useful for re-hydration.

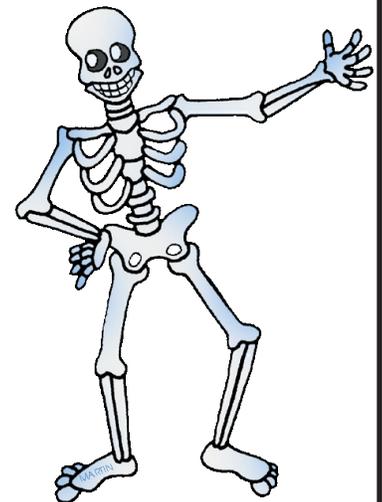
**Nervous System and Brain:** Eating a well-balanced diet is important for keeping your nervous system running smoothly. The B vitamins, potassium and calcium found in dairy products help the nervous system to function properly, while calcium helps your nervous system respond to and heal from injuries. Vitamin D assists by helping the body to absorb calcium.

**Muscle Contractions:** A diet that is rich in calcium is needed for muscle contractions. Calcium is an electrolyte --- an electrically charged molecule that conducts electricity through the nerves and muscles.

**Skin and Eyes:** Dairy is rich in vitamin A which boosts eye health, helping your retinas function well. Vitamin A along with vitamin B2 (riboflavin) is also important for the health of the skin, hair and nails.

**Blood Pressure:** A diet containing fruits and vegetables, low-fat dairy products and low salt is recommended to helps reduce blood pressure. The potassium, magnesium and calcium found in dairy products are all linked to healthy blood pressure.

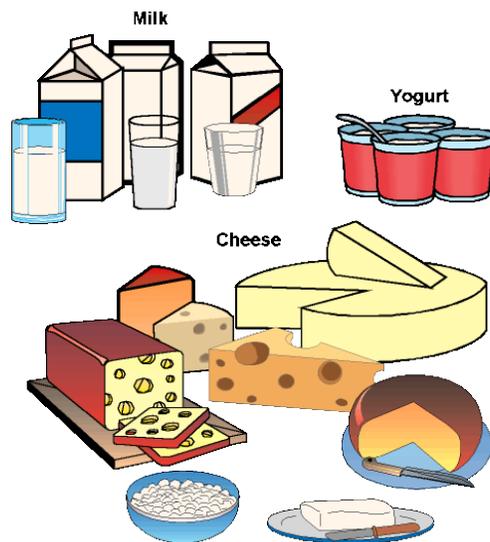
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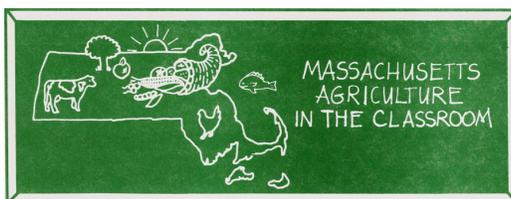
**Disease Protection:** Studies have discovered that diets containing milk and dairy products may significantly reduce the risk of certain cancers. Consumption of low fat milk and dairy has also been associated with a reduced risk of suffering a heart attack and developing type 2 diabetes. And low fat milk and dairy included in a controlled diet, can help with weight loss, especially from the abdomen, where fat deposits are associated with the greatest health risks.

**Dairy Servings:** It is recommended that children 4 to 8 years of age consume 2 servings of low-fat or fat free dairy every day and those 9 years and older consume 3 servings. One serving of dairy is: 1 cup (8 ounce) of low-fat or fat-free milk, 1 cup (8 ounce) low-fat or fat-free yogurt, 1.5 ounces reduced-fat natural cheese, 2 ounces reduced-fat processed cheese, or 1/3 cup reduced-fat shredded cheese. The dairy case has something for everyone -- including reduced fat and fat free options. One cup of fat-free milk provides 0.2 g. fat, one cup of whole milk has 7.93 g. fat. Families can choose different milk, yogurt and cheese products to meet their taste and nutritional goal.



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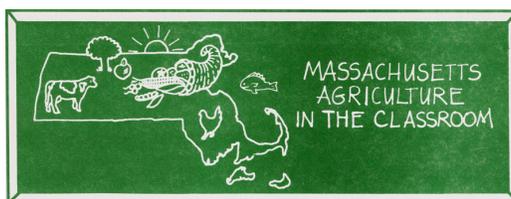
## Dairy Nutrition Chart

### Recommended Daily Allowance

Nutrient	RDA age 4-8	RDA age 9-13	In low fat milk
<b>Protein</b>	19 grams	34 grams	7.69 grams
<b>Calcium</b>	1,000 milligrams	1,300 milligrams	300 milligrams
<b>Potassium</b>	3,800 milligrams	4,500 milligrams	290 milligrams
<b>Vitamin A</b>	400 micrograms	600 micrograms	149 micrograms
<b>Vitamin D</b>	15 micrograms	15 micrograms	5 micrograms
<b>Vitamin B3 (niacin)</b>	8 milligrams	12 milligrams	.2 milligrams
<b>Vitamin B2 (riboflavin)</b>	.6 milligrams	.9 milligrams	.18 milligrams
<b>Vitamin B12</b>	1.2 micrograms	1.8 micrograms	1.2 micrograms
<b>Phosphorus</b>	500 milligrams	1,250 milligrams	232 milligrams
<b>Magnesium</b>	130 milligrams	240 milligrams	26.8 milligrams

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## DAIRY NUTRITION LESSON

**Grade Level:** Grades 2

### **Lesson/Activity Description**

In this lesson, students will learn about the nutrients in milk and what those nutrients do for their body.

### **Guiding Question**

What nutrients do we get from milk?

### **Big Idea**

Dairy products provide us with nutrients that we need to stay healthy. Though there are differences in the levels of fat in different types of milk, they have very similar nutrient levels.

### **Learning Objectives**

- To understand the importance of milk and dairy products for proper nutrition.

### **Materials**

- Milk Nutrition Worksheet

### **Preparation**

Review Dairy Nutrition background material at the beginning of this lesson.

### **Introducing the Lesson**

Talk about nutrients in milk and dairy products and why they are important to good health.

### **Activate prior knowledge**

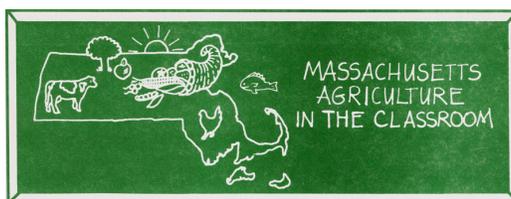
Ask students if they have heard about the vitamins and minerals that are found in the healthy foods that they should eat, for example calcium or vitamin D. What foods do they eat that give them these nutrients?

### **Engage Student Interest:**

Explain that they are going to learn about the different levels of nutrients in the different foods and what these nutrients do for the body.

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**Procedure**

Total time approximately. 30 minutes

1. Introduce the lesson; use the background information to explain to the students about nutrients people receive from milk.
2. Choose a few of the nutrients to discuss, such as those in the list below.

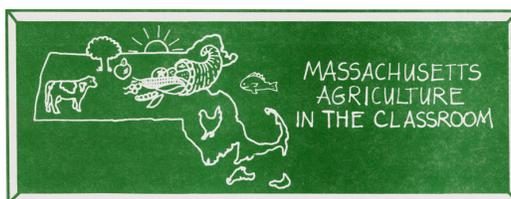
**Sample Chart**

Nutrient	What Nutrient Does For People
Protein	Adequate protein is important for energy and to maintain your muscles, balance fluids and build, maintain and repair tissues.
Vitamin D	Strong teeth and bones because it promotes the absorption of calcium and phosphorus and helps deposit them on the teeth and bones.
Vitamin A	Vital for good vision and healthy skin
B Vitamins	Help create red blood cells, keeps skin and nails healthy and maintain brain function.
Calcium	Builds Strong bones, teeth and muscles
Phosphorous	Responsible for cell growth and repair.

3. Select six students to play the role of an essential nutrient. Give each of the six students one of the cards with the name of a nutrient on it. Gather the rest of the class together and give each student a card with a nutrient source (food) on it.
4. One by one have the essential nutrient students stand up and read the description on their card. They can act out the part, for example, showing a muscle or washing their skin. After reading the description, the nutrient student will ask “What foods do you need to eat to get me?”. Then the seated students holding food cards that have that nutrient in it should rise, or raise their hand, and say what food they are that supplies this essential nutrient.
5. After all the essential nutrient cards have been read, ask the students what they noticed about the nutrients in food. (They should notice that dairy products contain all of the nutrients mentioned, and that all of these nutrients can also be obtained from other sources.)

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### **Wrap up**

Why is milk essential to a healthy diet?

### **Assessing Student Knowledge**

For homework, have students keep track of their dairy intake for one day, how many times did they eat or drink a dairy product?

### **Extensions**

Have the students explore the nutrient levels in other dairy products for example yogurt, cheese and ice cream.

**\* Some of the Massachusetts Department of Education Standards in this lesson \***

### **Nutrition**

3.1. Identify the key nutrients in food that support healthy body systems (skeletal, circulatory) and recognize that the amount of food needed changes as the body grows.

### **Nutrition**

3.10. Describe the components of a nutrition label and how to use the information from labels to make informed decisions regarding food.

### **Resources**

#### **Massachusetts Dairy Promotion Board**

<http://massdairy.com>

#### **New England Dairy & Food Council**

<http://newenglanddairyCouncil.org>

#### **National Dairy Council**

<http://www.nationaldairyCouncil.org>

#### **Office of Dietary Supplement - National Institutes of Health**

<http://ods.od.nih.gov/factsheets/list-all/>

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# Nutrient

## Vitamin A

I am Vitamin A and I am responsible for healthy eyes and skin.



## Vitamin D

I am Vitamin D and I help maintain healthy teeth and bones.



## Calcium

I am Calcium and I make your bones and teeth strong. I am also important for muscles.



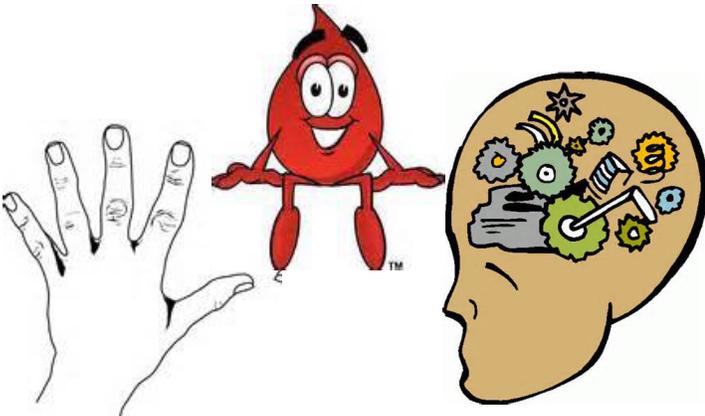
## Protein

I am Protein. I am important for energy and to help maintain strong muscles.



## B Vitamins

I am Vitamin B and I am important for healthy skin, nails, brain, and blood.



## Phosphorus

I am Phosphorus and I help build all the cells in your body and keep them healthy.

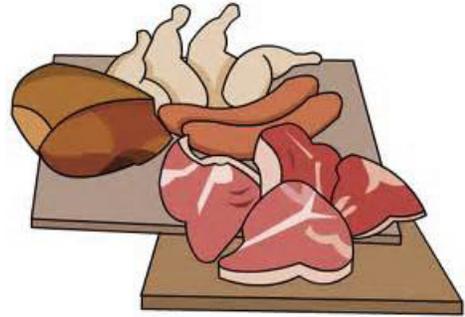


## Dairy Products



Vitamin A, D, B, Protein, Calcium & Phosphorous

## Meat and Poultry



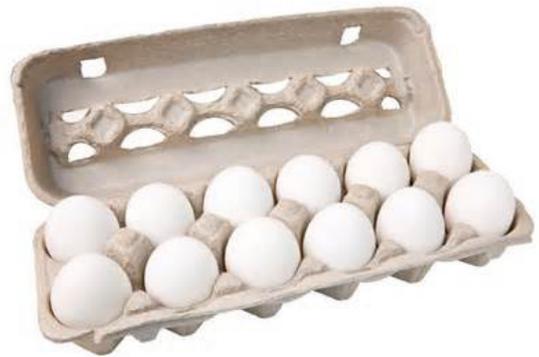
Vitamin A, B, Protein, & Phosphorous

## Fish



Vitamin A, D, B, Protein, Calcium & Phosphorous

## Eggs



Vitamin A, B, Protein, & Phosphorous

## Whole Grains



Vitamin B, Protein & Phosphorous

## Leafy Greens



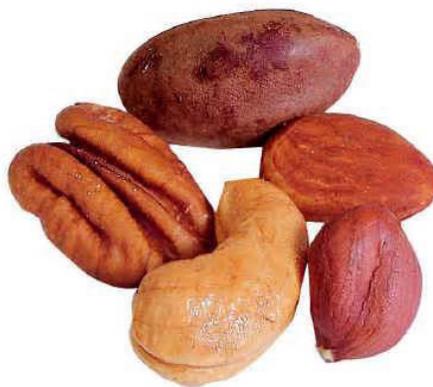
Vitamin A, B, Calcium & Phosphorous

## Red, Yellow and Orange Fruits & Vegetables



Vitamin A & Phosphorous

## Nuts and Seeds



Protein & Phosphorous

## Fortified Orange Juice



Vitamin A, D, Calcium & Phosphorous

## Fortified Cereal



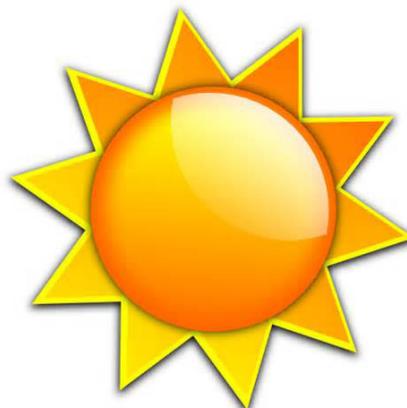
Vitamin A, Protein, & Phosphorous

## Beans



Protein, Calcium & Phosphorous

## Sunshine



Vitamin D