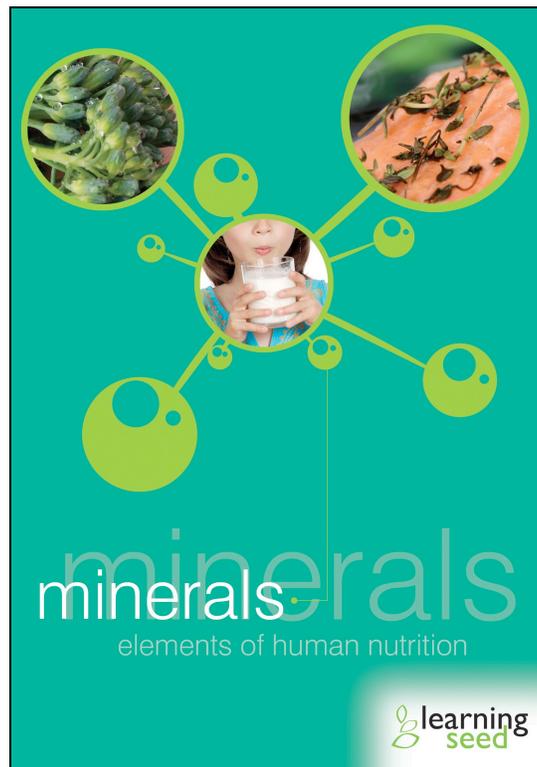


Minerals

Elements Of Human Nutrition



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Suite 301
641 West Lake Street
Chicago, IL 60661
800.634.4941

info@learningseed.com
www.learningseed.com

Minerals: Elements Of Human Nutrition

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The Video

Executive Producer: Kathleen O. Ryan

Writer: Kathleen O. Ryan

Producer: Kathleen O. Ryan

Director: Michel Poglitsch

Editor: Michael Poglitsch

Narrator: Bohus Blahut

This Teaching Guide

Compilation: Ixta Menchaca

Copy Editor: Jennifer Smith

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Learning Seed

Suite 301

641 West Lake Street

Chicago, IL 60661

800.634.4941

info@learningseed.com

Summary

Minerals are one of the nutrient groups vital to the human body. Minerals, like vitamins, are chemicals that the human body needs to function properly, but unlike vitamins, minerals come entirely from the earth and always retain their chemical identity. In order to maintain a balanced diet that provides essential minerals, it is important to understand how minerals function and in what foods they can be found.

Key points:

- There are two types of minerals important to the body – major minerals and trace minerals. Major minerals are the minerals of which the body requires the most quantities, while trace minerals are minerals that are still essential to the body, but in smaller quantities.
- The seven major minerals are: calcium, phosphorus, potassium, sulfur, sodium, chloride, and magnesium.
- The nine trace minerals are: iron, zinc, copper, iodine, selenium, manganese, fluorine, chromium, and molybdenum.
- Calcium is the body's most abundant mineral and makes up approximately 2% of a person's total body weight in bones and teeth. Calcium is present in dairy-rich foods and some vegetables like bok choy and kale. A deficiency of calcium can lead to osteoporosis.
- Phosphorus is the body's second most abundant mineral and is found in every cell and part of DNA and RNA. Like calcium, it helps build bones and teeth, but it is also important to metabolism. Sources of phosphorus include milk, cheese, and meat.
- Potassium is the third most abundant mineral in the body and is an electrolyte that helps with proper nerve and muscle functions including the beating of the heart. Potassium-rich foods include bananas, broccoli, carrots, strawberries, and artichokes.
- Sulfur is the fourth most abundant body mineral. Sulfate is the oxidized form of sulfur and is present in the body as part of some proteins. Eating a protein-rich diet containing foods like meat, fish, poultry, eggs, milk, and legumes provides the necessary amount of sulfates for the body.
- Sodium and chloride are the fifth most abundant minerals in the body, and are both electrolytes that help to maintain fluid and electrolyte balance. Significant sources of sodium and chloride include table salt, soy sauce, and processed foods.
- Magnesium is the sixth most abundant mineral in the body and last of the major minerals. It works with calcium to assist in muscle contraction, blood clotting, and the regulation of blood pressure and lung function. Sources of magnesium include halibut, cashews, and artichokes.

- Iron is the most abundant trace mineral, is found in protein-rich foods, and helps proteins take in, carry, and release oxygen throughout the body. There are two types of iron: heme iron, only found in food made from animals and 10% of iron intake, and nonheme iron, found in foods from both animals and plants, absorbed less easily, and 90% of iron intake. A deficiency of iron can lead to iron deficiency anemia.
- Zinc is the second most abundant trace mineral, assists in enzyme reactions necessary for bloodclotting, and is essential to taste, vision, and wound healing. Oysters provide more zinc than any other food.
- Copper colors hair and skin and helps form the protective shield around nerve fibers. Sources of copper include shellfish, legumes, and whole grains.
- Iodine is important to thyroid functions that help regulate growth and development. Iodine-rich foods include iodized salt, seafood, bread, dairy products, plants grown in iodine-rich soil, and animals that eat that iodine-rich soil. A deficiency of iodine can lead to goiter.
- Selenium, a mineral only identified in the last 50 years as crucial for the heart, defends against oxidation and regulates the thyroid hormone. It can be found in whole grains, fruits, and vegetables grown in selenium rich soil.
- Manganese assists with bone formation and metabolic functions. It is found in nuts, whole grains, leafy vegetables, and tea.
- Fluorine helps to strengthen bones and make teeth more resistant to decay. Fluorine can be found in fish and teas, but in higher quantities in drinking water when fluoridated.
- Chromium enhances the activity of insulin and helps to maintain insulin levels. Sources of chromium include meats, especially liver, brewer's yeast, and whole grains.
- Molybdenum is only needed in very tiny amounts in the body, but it plays an important role in functions like carrying oxygen and healing wounds. It can be found in legumes, cereals, and nuts.

Mineral Basics

What is a mineral?

Minerals are one of the nutrient groups vital to the human body. Minerals, like vitamins, are chemicals the human body needs to function properly, but unlike vitamins, minerals come entirely from the earth and always retain their chemical identity. The nutrients in food, as a result, are only as rich in minerals as the soil where the food grows.

When cooking food, the minerals are not changed or destroyed by mixing with other substances, exposure to air, or extreme heat. From the time a mineral is ingested into the body, to the time it is excreted, it is never changed into anything else. However, some minerals in boiled foods may be lost because they attach to water molecules.

There are two types of minerals: major minerals which are required in higher amounts in the body, and trace minerals, which amount to less than a teaspoon of a person's body weight.

The seven major minerals are:

Calcium
Phosphorus
Potassium
Sulfur
Sodium
Chloride
Magnesium

The nine trace minerals are:

Iron
Zinc
Copper
Iodine
Selenium
Manganese
Fluorine
Chromium
Molybdenum

But all minerals vital to the human body are important because they serve necessary functions.

Major Minerals

What functions in the body do the major minerals serve, in what foods are they found, and in what amounts should they be consumed?

The major minerals are calcium, phosphorus, potassium, sulfur, sodium, chloride, and magnesium.

Calcium

Calcium is the body's most abundant mineral – about 2% of body weight is calcium in bones and teeth. A little is scattered in soft tissue like muscles and organs. Calcium is a bone builder, but is also needed to move muscles, clot blood, and fire nerves. Most calcium comes from dairy foods like milk, cheese, and yogurt. Calcium is found in milk because of the grass that cows eat from calcium-rich soil. However, milk products are not the only foods that supply people with calcium. Those who don't like or are unable to eat dairy products can get calcium from bok choy, broccoli, kale, and spinach. Additionally, canned sardines are a good source of calcium because they are eaten with their bones. Oysters and calcium-fortified orange juice are other good sources of calcium.

Recommendations for calcium intake vary in relationship to a person's age. Adequate intake of calcium for adults is 1000 milligrams. The amount increases to 1200 milligrams for people over the age of 50 as well as pregnant and nursing mothers.

To meet such recommendations, drinking an 8 ounce glass of milk, an 8 ounce glass of orange juice, 3 ounces of sardines with bones, and one slice of American cheese is sufficient.

Children only use 1% of the calcium they eat to move muscles, regulate blood pressure, and transmit nerve impulses. The remaining 99% is stored in bones and teeth.

But bones are not fixed – in fact, in a year, about 20 % of bone in the body is replaced. Bone is well-supplied with blood, and minerals constantly move in and out of bones.

By the age of 20, nearly three pounds of calcium has been stored in a person's bones. But around age 21, calcium begins to be spent rather than stored and the body starts to draw on its calcium reserves.

Millions of people suffer from osteoporosis – weak, porous bones – and 80% of people with osteoporosis are women. Symptoms of osteoporosis include back pain, stooped posture, height loss, and bones that break easily.

Exercise can add calcium to bones by improving the flow of blood. However, this exercise must be weight-bearing, so walking, low-impact aerobics, and stair-step machines are better than swimming or biking. People who are inactive lose bone mass. In fact, astronauts who spend time in a state of weightlessness actually lose measurable bone mass because they put zero stress on their bones.

Phosphorus

Phosphorus is the second most abundant mineral in the body. It is found in every cell in the body and is also part of our DNA and RNA that are the building blocks of life and growth. Phosphorus, like calcium, also builds bones and teeth. It is also important to metabolism, which are all the reactions by which our bodies obtain and expend energy from food. ATP, which is important to cellular energy, is partly made up of phosphates. Additionally, Vitamin B can only become active in the body when it is chemically attached to phosphates.

Phosphorus is plentiful in most foods, but main sources include milk, cheese, and meat. Adults need 700 milligrams of phosphorus a day. A menu rich in phosphorus might include an 8 ounce glass of milk, 2 ounces of nuts, a half cup of shredded wheat, 2/3 a cup of oatmeal, and a slice of cheese.

Potassium

The third most abundant mineral in the body is potassium. Potassium is an electrolyte, a chemical that dissolves in water and turns into charged particles called ions. These circulate in the blood, in and out of the fluid of the cells, and help with proper nerve and muscle functions. The beating of the heart is based on impulses that require electrolytes.

Potassium is plentiful in all living plant and animal cells, but fresh fruits and vegetables are the richest sources of potassium. Broccoli, carrots, strawberries, bananas, and artichokes are excellent sources of potassium. Adults require 4700 milligrams of potassium each day. A menu rich in potassium might include, three 8 ounce servings of milk, one cup of tomato juice, 6 ounces of meat, one cup of broccoli, one medium potato, 2/3 a cup of raisins, and one banana.

Sulfur

Ranking number four in mineral abundance in the body is sulfur. Sulfate is the oxidized form of sulfur and is present in the body as part of some proteins. In fact, the body's need for sulfate is met with a normal intake of protein.

An average protein intake equals two 3 ounce portions of meat and 3 glasses of milk, so there is no recommended intake for sulfur itself. Simply eating a diet with protein-rich foods like meats, fish, poultry, eggs, milk, and legumes will provide an adequate amount of sulfate.

Sodium and Chloride

Sodium and chloride tie for the fifth most abundant minerals in the body. They are both electrolytes, like potassium, and have a close relationship with each other. Together they maintain fluid and electrolyte balance. Their most significant relationship is their combination in the form of salt.

Most cultures use salt to some degree in seasoning food. Salt provides its own flavor as well as enhances other flavors in foods.

When something containing sodium is eaten, it is absorbed in the intestines and then travels in the blood to the kidneys. The kidneys filter the sodium out of the blood and send out the exact amount of sodium that the body

needs. If too much salt is eaten, the sodium level of the blood rises causing the body to become thirsty until enough water is drunk to even out the sodium-to-water ratio.

Significant sources of sodium are table salt, processed foods, and soy sauce. Moderate sources include meat, breads, and vegetables.

Adequate intake for sodium is 1500 milligrams for people from ages 19 to 50, 1300 milligrams for people 51-70, and then drops to 1200 milligrams for people over 70. There is an upper level intake recommended for adults at 2300 milligrams, which equals about a teaspoon. However, most adult diets exceed this on a daily basis. If people replace processed foods with fresh foods, though, they can also improve their intake of other nutrients, like potassium, while reducing their risk of high blood pressure due to too much sodium.

Chloride, in its elemental form, chlorine, is poisonous, but when it reacts with sodium or hydrogen, it forms the negative ion chloride.

Aside from its partnership in creating salt, chloride also plays a role in the high acid content in the gastric juices in the stomach. These juices help us to digest food.

Significant sources of chloride are found in processed foods, table salt, and soy sauce. Moderate sources can be found in meat, eggs, and milk.

Adequate intake is set at 2300 milligrams for ages 19 to 50, 2000 milligrams for people 51 to 70, and 1800 milligrams for those over 70. Its upper level recommendation is 3600 milligrams a day. Because of its partnership with sodium in the make up of salt, chloride needs are met with the same $\frac{3}{4}$ a teaspoon as sodium.

Magnesium

The final major mineral found in the body is magnesium, of which there is only an ounce or less. While this amount is tiny compared to the amount of calcium, magnesium takes part in over 300 reactions in the body. More than half the body's magnesium is found in bones. Calcium and magnesium complement one another. Calcium provides strength; magnesium provides elasticity to prevent injury. Magnesium also works with calcium to assist in muscle contraction, blood clotting, and the regulation of blood pressure and lung function. Excellent sources of magnesium are halibut, cashews, and artichokes. It can also be found in many other foods such as whole grains, dark green vegetables, and seafood.

Adequate intake for magnesium is 410 milligrams for males and 360 milligrams for females ages 14 to 19, 400 milligrams for males and 310 milligrams for females ages 19 to 30, and 420 milligrams for males and 320 milligrams for females ages 31 and older.

An example of how intake of 300 milligrams can be achieved is one cup of cooked spinach, 3 ounces of halibut, 2 tablespoons of peanut butter, a small baked potato, 8 ounces of plain yogurt, and one banana.

Trace Minerals

What functions in the body do the trace minerals serve, in what foods are they found, and in what amounts should they be consumed?

The major minerals are iron, zinc, copper, iodine, selenium, manganese, fluorine, chromium, and molybdenum.

Iron

The trace mineral most abundant in the body, approximately 2.4 grams, is iron.

When foods with iron are eaten, it is absorbed into proteins and helps these proteins take in, carry, and release oxygen throughout the body.

Iron in food comes in two forms: heme and nonheme. Heme iron is only found in food made from animals like meat, fish, and poultry. It is easily absorbed into the body, and makes up about 10% of the iron intake of most people. Nonheme iron is found in foods from both animals and plants. It is less easily absorbed in the body and makes up about 90% of the iron intake of most people.

Meat, fish, and poultry give people the most iron per serving. Interestingly, canned clams and parsley provide more iron than most servings of meat. Other good sources are legumes, eggs, whole grain bread, and fortified cereals. “Enriched” bread, dark green vegetables, and dried fruits can also provide some iron.

The RDA for iron is 18 milligrams for women and vegetarians and is 8 milligrams for men and women over 51. An iron-rich menu might include one cup of tomato juice, ½ cup of cooked pinto beans, 3 ounces of lean ground beef, one ounce of sunflower seeds, and 2 slices of whole wheat bread.

Some good options for vegetarians are soy foods, legumes, seeds and nuts, cereals, dried fruits, and vegetables.

An iron deficiency called iron-deficiency anemia is very common around the world, especially for women and children in developing nations. There are fewer cases of iron deficiency in the US and Canada, yet it still appears in about 10% of toddlers, adolescent girls, and women of childbearing age. Deficiencies have also been seen in overweight children and adolescents. Symptoms of iron deficiency take years to develop and include fatigue, weakness, and shortness of breath.

Eating foods rich in vitamin C helps us absorb iron. Some ways to do this include eating iron-fortified cereal with strawberries, with a glass of orange juice, or eating meat with tomatoes or green peppers. People can also get iron from nonfood sources like foods cooked in an iron skillet. For example, eggs scrambled in an iron skillet will triple their iron content. Doctors may also prescribe iron supplements to people who are deficient.

Too much iron can also be a problem. An iron overload disorder has been linked to diabetes, heart disease, liver cancer, and arthritis. Ingestion of iron supplements is a leading cause of accidental poisoning for children.

Zinc

At 2 grams, zinc is the second most abundant trace mineral in the body. It is a component of every living cell and plays a role in hundreds of bodily functions, from assisting in enzyme reactions to blood clotting, and is essential to taste, vision, and wound healing.

Of all foods, oysters provide the most zinc per serving. Red meat and poultry are also good sources of zinc. The RDA for zinc is 11 milligrams for men and 8 milligrams for women.

One way to achieve an intake of 11 milligrams of zinc would be to eat 3 ounces of lean ground beef, 3 ounces of cooked crab, one cup of plain low-fat yogurt, and one tablespoon of peanut butter.

Copper

Copper makes up approximately .9 grams of the body. It can be found in some enzymes that are crucial to oxygen reactions and the way iron is metabolized. It also colors hair and skin, and helps form the protective shield around nerve fibers.

Good sources of copper are shellfish, legumes, and whole grains.

Most diets provide a person with the amount of copper needed by the body.

Iodine

Iodine is another trace mineral important to the body. The primary function of iodine is its role in thyroid functions that help regulate growth and development.

Table salt was fortified with iodine in 1924 to help prevent an iodine deficiency disease. At that time, a thyroid enlargement called goiter was so common that it became the leading medical reason for rejecting military recruits for World War I. Iodine-deficient soil was discovered as the cause and iodine was added to table salt. The additive was so successful that goiter is rare today.

In addition to iodized salt, good dietary sources of iodine are seafood, bread, dairy products, plants grown in iodine-rich soil, and animals that eat plants grown in iodine-rich soil.

Selenium

Selenium was identified as an essential nutrient to the body only within the last fifty years. Before that, it was believed toxic in any amount. Since then it has been discovered as crucial to the heart. It also defends against oxidation and regulates the thyroid hormone.

Deficiencies of selenium include a greater chance of getting heart disease caused by cardiac tissues becoming fibrous.

Since selenium is found in the soil, whole grains, fruits, and vegetables grown in selenium-rich soil, as well as meat from animals that have eaten these, are the best sources for this mineral.

Manganese

There are just 20 milligrams of manganese present in the body, primarily in the bones and vital organs. However, this trace mineral is still crucial in assisting with bone formation and metabolic functions. Manganese is readily found in nuts, whole grains, leafy vegetables, and tea.

Fluorine

Fluoride helps to strengthen bones and make teeth more resistant to decay. Since dental health is so important to overall well-being, having enough fluoride is vital.

Some fluoride can be found in soil, plants, and animals. Fish and most teas have a significant amount of fluoride, but drinking water provides the best and most abundant source of fluoride.

The fluoridation of public water can decrease incidents of tooth decay. Too much fluoride, on the other hand, can damage teeth. That is why it is important not to swallow toothpaste and mouthwashes that contain fluoride.

Chromium

Chromium is a trace, but again, essential mineral that helps with the performance of insulin in the body. Insulin is a hormone produced by the pancreas. It is important to how sugars are processed. Chromium enhances the activity of insulin and helps to maintain the necessary levels. When people lack chromium, a condition much like diabetes can develop.

Good sources of chromium include meats, especially liver, brewer's yeast, and whole grains.

Molybdenum

Molybdenum is a mineral required by the body in very tiny amounts. It is a working component in many enzymes and interacts with metal-based minerals like zinc and iron. It also plays a part in functions like carrying oxygen and healing wounds.

Significant sources of molybdenum are legumes, cereals, and nuts.

Questions For Discussion

1. Calcium is the body's most abundant mineral. What are some of the ways to build up stores of calcium in the body?

Eating and drinking calcium-rich foods and milk including cheese, yogurt, bok choy, broccoli, kale, sardines, oysters, calcium-fortified orange juice, and milk helps to build up the store of calcium in the body. Weight-bearing exercise like walking or running increases blood flow and adds calcium to bones.

2. Sodium and Chloride are two major minerals that are electrolytes and work together to maintain fluid and electrolyte balance. What foods cause an increase in sodium in the bloodstream and how are sodium levels in the body regulated?

Foods that are salty such as table salt, soy sauce, and high-sodium processed foods cause an increase in sodium to the bloodstream. When a person eats salty foods, the kidneys filter sodium out of the blood and send out the exact amount of sodium that the body needs. If foods are especially salty, the sodium level in the blood rises which provokes thirst. Consequently, drinking water will even out the sodium-to-water ratio.

3. Why is it so important that there be a careful balance of the amounts of both major and trace minerals in the body?

Too little of any mineral can lead to deficiencies with serious health consequences. Too much of certain minerals can lead to poisoning and other health problems. A deficiency of iron can lead to anemia, while too much iron can lead to iron overload disorders linked to diabetes, heart disease, liver cancer, and arthritis.

4. The addition of which mineral to table salt helped to greatly reduce the presence of what health condition? What are other foods, aside from table salt that provide this mineral?

Iodine was added to table salt to reduce the number of cases of goiter. Foods other than table salt that are iodine-rich include seafood, bread, dairy products, and plants grown in iodine-rich soil and animals that consume plants grown in iodine-rich soil.

5. What are the similarities and differences between vitamins and minerals?

Vitamins and minerals are utilized by the human body to perform critical functions, but only minerals come completely from the earth and maintain their chemical identity, unlike vitamins which can be easily broken down by the body, and some of which can be manufactured by the body from food or sunlight.

Suggested Activities

1. Look at the Nutrition Facts on the labels of food in your home. Compare the mineral content of different foods items, such as cereal, and report the findings to the class.
2. Research the mineral content of three foods and address how one could make them more mineral-rich.

Research Project

Research one major or trace mineral. Research the areas of the world where this mineral is most prevalent as well as the foods people consume to acquire the necessary amounts of this mineral. Address in detail how this mineral functions in the body and how a deficiency of this mineral affects the health of an individual.

Minerals: Elements Of Human Nutrition

Fill-In-The-Blank

Fill in the blanks with the correct words from the bank at the bottom of the page.

Both vitamins and minerals are chemicals the human body needs to function, but unlike vitamins, minerals come only from the earth and always keep their chemical identity. Minerals are divided into two groups: _____ minerals, needed in higher quantities in the body, while _____ minerals amount to no more than a teaspoon of body weight. Most mineral content in the human body is in bones as _____ and _____. These two minerals are important to building strong bones, but other minerals serve important functions, too. For example, the third most abundant mineral in the body, _____, found in high amounts in bananas, broccoli, and strawberries, is also an electrolyte assisting proper nerve and muscle function including the beating of the heart. Another mineral important to the body is _____, which can be found in large amounts in table salt and soy sauce. All minerals essential to the body are important and deficiencies of certain minerals can cause serious health conditions. A deficiency of _____, the most abundant trace mineral and the mineral found the most per serving in meat, fish, and poultry, can result in _____. A lack of _____ can lead to _____, an enlargement of the thyroid that became the leading medical reason for rejecting military recruits for World War I. When people lack _____, the mineral that helps with the performance of insulin in the body, a condition much like _____ can occur. And a deficiency of _____, a mineral only identified in the last fifty years as crucial to the heart, can pose a greater chance of heart disease caused by cardiac tissues becoming fibrous. However, some minerals can be added to certain foods and products to provide the body with additional nutrients such as _____, which when added to drinking water, can prevent tooth decay.

Word Bank:

anemia	calcium	chromium	diabetes	fluorine	goiter	iodine
iron	major	phosphorus	potassium	selenium	sodium	trace

Elements Of Human Nutrition: Minerals

Fill-In-The-Blank Answer Key

Both vitamins and minerals are chemicals the human body needs to function, but unlike vitamins, minerals come only from the earth and always keep their chemical identity. Minerals are divided into two groups: major minerals, needed in higher quantities in the body, while trace minerals amount to no more than a teaspoon of body weight. Most mineral content in the human body is in bones as calcium and phosphorus. These two minerals are important to building strong bones, but other minerals serve important functions, too. For example, the third most abundant mineral in the body, potassium, found in high amounts in bananas, broccoli, and strawberries, is also an electrolyte assisting proper nerve and muscle function including the beating of the heart. Another mineral important to the body is sodium, which can be found in large amounts in table salt and soy sauce. All minerals essential to the body are important and deficiencies of certain minerals can cause serious health conditions. A deficiency of iron, the most abundant trace mineral and the mineral found the most per serving in meat, fish, and poultry, can result in anemia. A lack of iodine can lead to goiter, an enlargement of the thyroid that became the leading medical reason for rejecting military recruits for World War I. When people lack chromium, the mineral that helps with the performance of insulin in the body, a condition much like diabetes can occur. And a deficiency of selenium, a mineral only identified in the last fifty years as crucial to the heart, can pose a greater chance of heart disease caused by cardiac tissues becoming fibrous. However, some minerals can be added to certain foods and products to provide the body with additional nutrients such as fluorine, which when added to drinking water, can prevent tooth decay.

Minerals: Elements Of Human Nutrition

Multiple Choice Worksheet

Circle the best available answer for each of the following:

1) The trace mineral in the body that contributes to skin and hair coloring and helps form the protective shield around nerve fibers is:

- a) iodine
- b) copper
- c) sulfate
- d) calcium

2) This major mineral is poisonous in its elemental form but not when it reacts with sodium or hydrogen to form a negative ion:

- a) magnesium
- b) calcium
- c) selenium
- d) chloride

3) All of these are trace minerals, EXCEPT:

- a) molybdenum
- b) fluorine
- c) potassium
- d) zinc

4) Calcium makes up approximately this percentage of human body weight:

- a) 2%
- b) 15%
- c) 22%
- d) 45%

5) These two minerals tie for the 5th most abundant minerals present in the body:

- a) sulfur and sodium
- b) calcium and sulfur
- c) sodium and chloride
- d) iron and iodine

6) The addition of this trace mineral to public water can decrease incidents of tooth decay:

- a) molybdenum
- b) fluoride
- c) iodine
- d) iron

7) The disease characterized by weak, porous bones is:

- a) iron deficiency anemia
- b) goiter
- c) diabetes
- d) osteoporosis

8) This food provides the body with more zinc than any other food:

- a) oysters
- b) enriched bread
- c) milk
- d) tea

9) All these are major minerals, EXCEPT:

- a) potassium
- b) chromium
- c) calcium
- d) magnesium

10) In one year, approximately this percentage of bone is replaced in the human body:

- a) 2%
- b) 11%
- c) 20%
- d) 55%

Elements Of Human Nutrition: Minerals

Multiple Choice Worksheet Answer Key

1) The trace mineral in the body that contributes to skin and hair coloring and helps form the protective shield around nerve fibers is:

- a) iodine
- b) copper**
- c) sulfate
- d) calcium

2) This major mineral is poisonous in its elemental form but not when it reacts with sodium or hydrogen to form a negative ion:

- a) magnesium
- b) calcium
- c) selenium
- d) chloride**

3) All of these are trace minerals, EXCEPT:

- a) molybdenum
- b) fluorine
- c) potassium**
- d) zinc

4) Calcium makes up approximately this percentage of human body weight:

- a) 2%**
- b) 15%
- c) 22%
- d) 45%

5) These two minerals tie for the 5th most abundant minerals present in the body:

- a) sulfur and sodium
- b) calcium and sulfur
- c) sodium and chloride**
- d) iron and iodine

6) The addition of this trace mineral to public water can decrease incidents of tooth decay:

- a) molybdenum
- b) fluoride**
- c) iodine
- d) iron

7) The disease characterized by weak, porous bones is:

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10) In one year, approximately this percentage of bone is replaced in the human body:

- a) 2%
- b) 11%
- c) 20%**
- d) 55%

Minerals: Elements Of Human Nutrition Quiz

Match the words in the first column to the best available answer in the second column.

- | | | |
|-------|---|-----------------|
| _____ | The second most abundant major body mineral, which is critical to metabolism and found primarily in milk, cheese, and meat. | 1) nonheme iron |
| _____ | A thyroid enlargement due to a deficiency of iodine in the body. | 2) potassium |
| _____ | The type of iron found in food made from both animals and plants and makes up approximately 90% of iron intake. | 3) heme iron |
| _____ | The trace mineral most abundant in the body, which is found in high quantities in meat, fish, poultry, legumes, and eggs. | 4) sulfate |
| _____ | The third most abundant major body mineral, which is an electrolyte and is found in high amounts in broccoli and bananas. | 5) iron |
| _____ | An iron deficiency common around the world, particularly in developing nations. | 6) phosphorus |
| _____ | The type of iron found only in food made from animals and makes up approximately 10% of iron intake. | 7) goiter |
| _____ | The fourth most abundant major mineral in the body, which is present as part of some proteins and can be found in protein-rich foods. | 8) anemia |

Elements Of Human Nutrition: Minerals

Quiz Answer Key

- 6) phosphorus The second most abundant major body mineral, which is critical to metabolism and found primarily in milk, cheese, and meat.
- 7) goiter A thyroid enlargement due to a deficiency of iodine in the body.
- 1) nonheme iron The type of iron found in food made from both animals and plants and makes up approximately 90% of iron intake.
- 5) iron The trace mineral most abundant in the body, which is found in high quantities in meat, fish, poultry, legumes, and eggs.
- 2) potassium The third most abundant major body mineral, which is an electrolyte and is found in high amounts in broccoli and bananas.
- 8) anemia An iron deficiency common around the world, particularly in developing nations.
- 3) heme iron The type of iron found only in food made from animals and makes up approximately 10% of iron intake.
- 4) sulfate The fourth most abundant major mineral in the body, which is present as part of some proteins and can be found in protein-rich foods.

Glossary

Heme iron	Iron found in food made from animals, including meat, fish, and poultry. It is easily absorbed into the body, and makes up about 10% of the iron intake of most people.
Minerals	Chemicals that come completely from the earth, always keep their chemical identity, and which the human body needs to function.
Major minerals	The seven minerals needed by the human body in the largest quantities. These include calcium, phosphorus, sulfur, potassium, magnesium, sodium, and chloride.
Nonheme iron	Iron found in foods from both animals and plants. It is less easily absorbed into the body than heme iron and makes up about 90% of the iron intake of most people.
Sulfate	Sulfate is the oxidized form of sulfur and is present in our bodies as part of some proteins
Trace minerals	The nine minerals essential to the human body but in lower quantities than major minerals. These include iron, zinc, copper, iodine, selenium, manganese, fluorine, chromium, and molybdenum.

For More Information...

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Minerals
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<http://www.nlm.nih.gov/medlineplus/minerals.html>

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Vitamin and Minerals Supplements
Nutrition.gov
http://www.nutrition.gov/nal_display/index.php?info_center=11&tax_level=2&tax_subject=393&topic_id=1762&placement_default=0

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United States Department of Agriculture
http://fnic.nal.usda.gov/nal_display/index.php?info_center=4&tax_level=3&tax_subject=274&topic_id=1323&level3_id=5147&level4_id=0&level5_id=0&placement_default=0

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Kids Health - Kids
<http://kidshealth.org/kid>

Kids Health - Teen
<http://kidshealth.org/teen>

Kids Health - Parent
<http://kidshealth.org/parent>

Arbor Nutrition Guide
<http://arborcom.com>

Mayo Clinic - Food And Nutrition
www.mayoclinic.com/health/food-and-nutrition/NU99999

Gatorade Sports Science Institute
www.gssiweb.com

National Dairy Council
www.nationaldairycouncil.org

American Dietetic Association – Eat Right
www.eatright.org

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www.americanheart.org

United States Department of Agriculture – My Pyramid
www.mypyramid.gov

WebMD
www.webmd.com

Harvard – School of Public Health
www.hsph.harvard.edu/nutritionsource

Centers for Disease Control and Prevention – Healthy Living
<http://cdc.gov/HealthyLiving>