I'm not a bot



Iron is an important mineral that helps maintain healthy blood. A lack of iron is called iron-deficiency worldwide, causing extreme fatigue and lightheadedness. It affects all ages, with children, women who are pregnant or menstruating, and people receiving kidney dialysis among those at highest risk for this condition. Iron is a major component of hemoglobin, a type of protein in red blood cells to transport oxygen, which leads to fatigue. Iron is also part of myoglobin, a protein that carries and stores oxygen specifically in muscle tissues. Iron is important for healthy brain development and growth in children, and for the normal production and function of various cells and hormones. Iron from food comes in two forms: heme and non-heme. Heme is found only in animal flesh like meat, poultry, and seafood. Non-heme iron is found in plant foods like whole grains, nuts, seeds, legumes, and leafy greens. Non-heme iron is also found in animal flesh (as animals consume plant foods with non-heme iron) and fortified foods. Iron is stored in the body as ferritin (in the liver, spleen, muscle tissue, and bone marrow) and is delivered throughout the body by transferrin (a protein in blood that binds to iron). A doctor may sometimes check blood levels of these two components if anemia is suspected. RDA: The Recommended Dietary Allowance (RDA) for adults 19-50 years is 8 mg daily for men, 18 mg for pregnancy, and 9 mg for pregnancy, and 9 mg for lactation. [2] The higher amounts in women and pregnancy are due to blood loss through menstruation and because of the rapid growth of the fetus requiring extra blood circulation during pregnancy, and 10 mg for lactation. The RDA for women 51+ years drops to 8 mg with the assumption that cessation of menstruation has occurred with menopause. It may be noted that menopause occurs later for some women, so they should continue to follow the RDA for younger women until menopause is confirmed. UL: The Tolerable Upper Intake Level is the maximum daily intake unlikely to cause harmful effects on health. The UL for iron is 45 mg daily for all males and females and females ages 14+ years. For younger ages, the UL is 40 mg. Meats, poultry, and seafood are richest in heme iron. Fortified grains, nuts, seeds, legumes, and vegetables contain non-heme iron. Fortified grains, nuts, seeds, legumes, and vegetables contain non-heme iron. Fortified grains, nuts, seeds, legumes, and vegetables contain non-heme iron. Fortified grains, nuts, seeds, legumes, and vegetables contain non-heme iron. Fortified grains, nuts, seeds, legumes, and vegetables contain non-heme iron. Fortified grains, nuts, seeds, legumes, and vegetables contain non-heme iron. Fortified grains, nuts, seeds, legumes, and vegetables contain non-heme iron. Fortified grains, nuts, seeds, legumes, and vegetables contain non-heme iron. Fortified grains, nuts, seeds, legumes, and vegetables contain non-heme iron. iron. Certain factors can improve or inhibit the absorption of non-heme iron. Vitamin C and heme iron taken at the same meal can improve the absorption of non-heme iron. [3] Fortified breakfast cereals Beans Dark chocolate (at least 45%) Lentils Spinach Potato with skin Nuts, seeds Enriched rice or bread Iron is available in supplement form. Some cereals and multivitamin/mineral supplements are fortified with 100% of the RDA for women for iron (18 mg). Over-the-counter high-dosage iron supplements prescribed for those with iron-deficiency anemia or who are at high risk for it may contain 65 mg or more. Commonly reported side effects of using high-dosage iron supplements, e.g., ferrous sulfate, ferrous fumarate, ferrous gluconate. Confusion is also caused by two number amounts listed on the label, a higher number and a lower number amount to take? Elemental versus chemical form of iron. If two iron amounts are listed on the label, the larger number is the chemical compound form because iron is bound to salts (e.g., ferrous sulfate), whereas the smaller number refers only to the amount of iron in the compound, also called the elemental iron. Elemental iron is the more important number because this is the amount of iron in the compound, also called the elemental iron. elemental iron. For example, a ferrous sulfate iron supplement may list a total of 325 mg of ferrous sulfate on the front of the label but 65 mg of iron, would you take five pills to equal 325 mg, or just one pill, assuming the prescription referred to elemental iron? Different types. All types of supplemental iron help to increase red blood cell production but vary in cost and amounts of elemental iron. Ferrous sulfate tablets. However, ferrous gluconate contains less elemental iron than ferrous sulfate, so a greater dosage may be needed to correct a deficiency. It is also more expensive than ferrous sulfate. Newer slow-release forms of iron have been introduced, which may help reduce gastrointestinal side effects, but they are more expensive and usually contain less iron. Any confusion with iron supplement types and amounts can be resolved by asking your doctor to specify both the elemental amount and the chemical compound amount. You can also ask a store pharmacist for assistance in interpreting a doctors prescription. An iron deficiency is seen most commonly in children, women who are menstruating or pregnant, and those eating a diet lacking in iron. Iron deficiency occurs in stages. [4] The mild form begins with a decrease in stored iron, usually either from a low-iron diet or from excessive bleeding. If this does not resolve, the next stage is a greater depletion of iron stores and a drop in red blood cells. Eventually this leads to iron-deficiency anemia (IDA) where iron stores are used up and there is significant loss of total red blood cells. Typically, a doctor screens for anemia by first checking a complete blood count (including hemoglobin, hematocrit, and other factors that measure red blood cell volume and size). If this is below normal, ferritin and transferrin levels may be measured to determine if the type of anemia is IDA (there are other forms of anemia not caused specifically by an iron deficiency). All of these measures would decrease with IDA. Signs of IDA: Fatigue, weakness Lightheadedness Confusion, loss of concentration Sensitivity to cold Shortness of breath Rapid heartbeat Pale skin Hair loss, brittle nails Pica: cravings for dirt, clay, ice, or other non-food items IDA is usually corrected with oral iron supplements of up to 150-200 mg of elemental iron daily. Blood levels should be rechecked periodically, and supplements discontinued or taken at a lower dosage if levels return to normal, as long-term high dosages can lead to constipation or other digestive upset. Groups at risk for IDA: Pregnant womenduring pregnancy a woman produces much greater amounts of red blood cells for the fetus, increasing the need for additional dietary or supplemental iron. IDA during pregnancy can lead to premature birth or low birth weight so iron is routinely included in prenatal vitamins. The Centers for Disease Control and Prevention recommend that all pregnant women begin taking 30 mg daily of supplemental iron. [3] Menstruating womenwomen who experience heavy bleeding during menstruation (lasting longer than 7 days or soaking through tampons or pads once every hour) can develop IDA. Childreninfants and children have high iron needs due to their rapid growth. Elderlyolder ages are associated with a higher risk of poor nutrition and chronic inflammatory diseases that can lead to anemia. [1] Vegetariansthose who eat a diet without heme iron from meats, fish, and poultry may develop IDA if they do not include adequate non-heme iron foods in the diet. Because non-heme iron is not well-absorbed, either greater quantities of these foods my be required or careful attention is needed in how they are eaten to improve absorption (consuming with vitamin C-rich foods while avoiding eating with calcium-rich foods while avoiding eating with calcium-rich foods while avoiding eating with vitamin C-rich foods while eating with vitam gastrointestinal bleeding and a condition called foot-strike hemolysis that breaks down red blood cells at a faster rate. Female endurance athletes who are also menstruating are at greatest risk for IDA. [4] People with chronic kidney failure on dialysisthe kidneys make a hormone called erythropoietin (EPO) that signals the body to make red blood cells. Kidney failure reduces the production of EPO and therefore blood cells. In addition, there is some blood loss during hemodialysis. What is anemia of chronic disease? Anemia of inflammatory bowel disease, heart failure, lupus, and rheumatoid arthritis. The body may actually contain normal amounts of iron, but levels in the blood are very low. Inflammation changes the bodys immune function, preventing the body from being able to use available stored iron to make red blood cells and also causing blood cells to die out more quickly. Treatment for AOCD focuses on treating the inflammatory condition. Increasing iron in the diet typically does not help. If the inflammation or condition improves, the anemia will usually decrease as well. In rare severe cases, a blood transfusion can be given to quickly boost the amount of hemoglobin in the blood. Toxicity is rare because the body regulates iron absorption and will absorb less if iron stores are adequate. [2] Excessive iron occurs most often from taking high-dosage supplements when not needed or from having a genetic condition that stores too much iron. Common signs: Constipation Upset stomach Nausea, vomiting Abdominal pain Some people have a hereditary condition called hemochromatosis that causes an excessive buildup of iron in the blood. People with hemochromatosis are educated to follow a low-iron diet and to avoid iron and vitamin C supplements. If left untreated, iron can build up in certain organs so that there is a higher risk of developing conditions like liver cirrhosis, liver cancer, or heart disease. It is possible to obtain enough iron in a vegetarian/vegan diet with careful planning. Try this easy dish that can boost iron levels by combining foods rich in non-heme iron and vitamin C: In a large bowl, combine cooked beans or lentils with diced fresh tomatoes, raw baby spinach, pumpkin seeds or cashews, and raisins or dried chopped apricots. Drizzle with a simple lemon vinaigrette made from 2 tablespoons olive oil, and 1 teaspoon of honey (optional). Stir ingredients well and allow to sit for at least 15 minutes to incorporate the flavors. Vitamins and Minerals References Le CH. The prevalence of anemia and moderate-severe anemia in the US population (NHANES 2003-2012). PLoS One. 2016 Nov 15;11(11):e0166635.Institute of Medicine. Food and Nutrition Board. Dietary Reference Intakes for Vitamin A, Vitam Nickel, Silicon, Vanadium, and Zinc: a Report of the Panel on Micronutrients. Washington, DC: National Academy Press; 2001. National Institutes of Health Professionals. Accessed 9/2/2019. Powers JM, Buchanan GR. Disorders of Iron Metabolism: New Diagnostic and Treatment Approaches to Iron Deficiency. Hematology/Oncology Clinics. 2019 Jun 1;33(3):393-408. Last reviewed March 2023 Kaushansky K, et al. Iron deficiency and overload. In: Williams Hematology. 9th ed. New York, N.Y.: The McGraw-Hill Companies; 2016. . Accessed Oct. 16, 2016. Schrier SL, et al. Treatment of iron deficiency anemia in adults. . Accessed Oct. 16, 2016. Schrier SL, et al. Treatment of iron deficiency anemia in adults. 2016.Iron-deficiency anemia. American Society of Hematology. . Accessed Oct. 16, 2016.What is iron-deficiency anemia? National Heart, Lung, and Blood Institutes. . Accessed Oct. 16, 2016.Schrier SL, et al. Approach to the adult patient with anemia. . Accessed Oct. 16, 2016. Mahoney DH, et al. Iron deficiency in infants and young children: Treatment. . Accessed Oct. 16, 2016. CBC with differential, blood. Mayo Medical Laboratories. and+Interpretive/9109. Accessed Oct. 16, 2016. Medical review (expert opinion). Mayo Clinic, Rochester, Minn. October 17, 2016. Iron is an important nutrient in our diets. So critical, in fact, that many foods, from infant formula to breakfast cereals, are commonly fortified with iron to help ensure we get enough of it. But there are risks to getting too much iron. How can you make sure you get the right amount? And why does iron matter so much? We talked with registered dietitian Lisa Reitz, RD, LD, about the benefits of iron and how to make sure you get the right amount of it in your body. Heres how. Iron helps your body to produce hemoglobin, a protein in your red blood cells. Hemoglobin carries oxygen from your lungs to the rest of your body. Iron also helps create the protein myoglobin, which provides oxygen to your muscles. When we don't have enough iron, our red blood cells cant transport oxygen as well, Reitz says. In fact, people who have an iron deficiency have smaller red blood cells. Thats because their blood has less hemoglobin and myoglobin and myoglobin and myoglobin and myoglobin and myoglobin and myoglobin means too little hemoglobin and myoglobin and less oxygen to plump them up. Its a domino effect. Too little hemoglobin and myoglobin and myog iron intake affects our health. Keeps energy levels up Your body uses oxygen for energy. And iron helps make sure your body gets the oxygen it needs to keep your energy levels up. Symptoms like fatigue and lightheadedness can have a lot of causes. And having low iron or iron-deficiency anemia is one of them, Reitz shares. Your body needs iron to help keep up with the demands of life. Aids brain health Your brain cells need a steady stream of oxygen-rich blood to function at their best. Iron helps your brain do things like build nerves, make and break down chemicals that allow your nerves to communicate, and keep your brain working in tip-top shape. So, when you dont have enough iron to supply oxygen to your brain, it can cause trouble. Boosts immunityIron helps keep your body moving and grooving through its daily processes. So, when you have less iron and therefore, less oxygen flowing through your system, some other tasks can fall by the wayside. That can include things like keeping up your immune system. People who have iron deficiency anemia can be less able to fight off certain infections and germs, Reitz explains. If you're not getting enough oxygen through your body, your body has to work harder just to try to keep going with the day to day. And things like your immune system can suffer. Think about it. When youre overtaxed with work, kids after-school commitments and other obligations, the dishes might start to pile up. Or the laundry might go undone. We all make tradeoffs in our lives. And your body does the same. Healthier hair For some people, one of the first signs that your iron is low can be a change in your hair. Or more specifically, the loss of it. Remember those tradeoffs we make? When your body chooses between sending its limited oxygen to your hair follicles, your organs or your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and oxygen to your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less blood and your hair follicles, your organs win out. Less recommended dietary allowances for iron (in milligrams): The World Health Organization (WHO) calls iron deficiency in the world, estimating that it affects 30% of people across the globe. Its more common in regions where foods arent fortified with iron. But it can affect anyone. Iron deficiency is also more common in people who are pregnant. That because, during pregnancy, you create more iron to make sure those blood cells get the oxygen they need. A healthy pregnancy diet should include plenty of iron. And be sure to choose a prenatal vitamin with adequate ironYou also need more iron during your menstruating years to counteract the loss of blood in each menstruating years to counter the loss of blood in each menstruating years to counter the loss of blood in each menstruating years to counter the loss of blood in each menstruating years to counter the loss of blood in each menstruating years to counter the loss of blood in each menstruating years to counter the loss of blood in each menstruating years to counter the loss of blood in each menstruating years to counter the loss of blood in each menstruating years to counter the loss of blood in each menstruating years to counter the loss of blood in each menstruating years. often. Whats more, certain medications, like proton pump inhibitors, commonly used for chronic acid reflux and stomach ulcers, can keep your body from absorbing iron properly, which can leave you at risk for deficiency. Getting more iron on your plateYour body doesnt make iron on its own. It has to get it from the foods you eat. Luckily, lots of foods are good sources of iron. Here are some of the top sources. Types of dietary ironNot all iron that you get from plant sources. The difference perhaps surprisingly has to do with vitamin C. Think of vitamin C as a buddy that helps your body properly use the iron available in your plant foods. Heme iron comes from food sources that also contain vitamin C, which helps the iron available in your plant foods. Heme iron to be more easily absorbed, Reitz explains. Non-heme iron will be better absorbed if you eat it along with foods that contain vitamin C. That could be foods like: Citrus fruits, like oranges, grapefruit and lemon. Cruciferous vegetables, like broccoli, kale and Brussels sprouts. White potatoes. Red peppers. Strawberries. Tomatoes. Should you take an iron supplement? Reitz suggests caution when considering iron supplements. Why? Iron is clearly important to your health, so it would seem natural to assume that more iron means better health. And what could be an easier way to get more iron in your life than to pop an iron supplements arent right for everyone. There is an upper limit to recommended iron intake. Thats because too much iron, particularly from supplements, can affect zinc absorption. And it can affect your getting the right amount of iron is to stick to a foods-first mentality. Thats to say: Choose foods that will give you the vitamins and nutrients that your body needs. And if you worry that youre not getting enough iron in your diet, talk with a healthcare provider, like a registered dietitian. An iron supplement may be beneficial to some people who dont get enough iron in their diet, Reitz notes. But I always urge people to talk with a healthcare provider before starting any supplement. Theyll be able to best advise you to make sure youre getting the right amount of nutrients and take into account any health conditions or medications that may affect your needs. Iron is a fundamental metal element used in article will explore the definitions, properties, types, and widespread applications of iron across various industries. The pure element iron, symbolized by the abbreviation from the construction of buildings and infrastructure to manufacturing and machinery. Additionally, it is critical in biology, notably in oxygen transport as part of the hemoglobin molecule in blood. The versatility of iron and its various alloys in terms of its strength, malleability, and magnetic properties are key to its use in manufacturing steel, machinery, tools, and infrastructure. A photograph showing raw iron and its symbol weight refers to the average of the atomic masses of all natural isotopes of an element. Iron is approximately 55.845 atomic mass units. Iron is primarily sourced from these ores and processed to make various iron and steel alloys. Iron has many desirable properties that make it useful for different applications. Some of the properties of iron are listed and described below: Irons strength, especially when alloyed with other metals, is a fundamental property that has led to its widespread use in: construction, manufacturing, and engineering and engineering that has led to its widespread use in: construction, manufacturing, and engineering that has led to its widespread use in: construction, manufacturing, and engineering that has led to its widespread use in: construction, manufacturing, and engineering that has led to its widespread use in: construction, manufacturing, and engineering that has led to its widespread use in: construction, manufacturing, and engineering that has led to its widespread use in: construction are listed and described below: Irons strength, especially when alloyed with other metals, is a fundamental properties that make it useful for different applications. With high tensile strength in the form of steel alloys, iron can withstand high loads and stresses without deforming or breaking. This property is crucial for building frameworks, bridges, machinery parts, automotive components, and more where structural integrity is critical. The versatility of iron lies in its ability to form various alloys, particularly steel, by combining with different metals. This versatility allows engineers and manufacturers to tailor irons properties to enhance performance to satisfy specific applications. Steel alloys derived from iron are utilized in a plethora of sectors including: construction, machinery, tools, power generation, household appliances, and more. Irons chemical reactivity is evident in its tendency to oxidize and form rust when exposed to oxygen and moisture. Managing irons reactivity by adding various alloying elements or coatings is essential in applications where corrosion and oxidation must be controlled to prevent premature failure of components. Corrosion-resistant and/or coated iron alloys, like stainless steels or weathering steels, find use in: marine environments, outdoor structures, machinery, and more. Compared to other metals like aluminum or titanium, iron is dense and its significant mass and strength-to-weight capacity are valued in certain applications. This property is advantageous for counterweights and ballasts in ships and heavy machinery. However, the high density of iron can also become a disadvantage in terms of transportation costs and design considerations. However, corrosion mitigation measures like alloying or coating are required to preserve irons metallic luster. Wrought iron, specifically valued for its appearance, is used in ornamental gates, fences, and furniture to enhance visual appeal while maintaining structural integrity. Iron has a relatively high melting point of about 1538 C. This property enables iron to withstand elevated temperatures without losing structural integrity. Its high-temperature resistance makes it suitable for applications in furnaces, engines, and industrial equipment operating under extreme conditions. Iron is a ferromagnetic material, which allows it to be used in various applications where magnetism is a desired property. However, some iron alloys, particularly austenitic stainless steels stainless steel with austenitic microstructures, are not magnetic. Magnetic applications include electric motors, transformers, and magnetic storage devices like hard drives. Iron is generally a malleable and ductile material that can be shaped and formed into various configurations without fracturing. However, this property largely depends on the alloying elements present in its composition. Some iron alloys are more ductile and malleable than others. This property is essential in manufacturing processes where shaping, machining, and molding are required to produce items like sheets, wires, and pipes used in construction and manufacturing. Iron is a moderate good conductor of electricity though not as conductive as other metals like aluminum or copper. Still, its electrical conductivity properties are adequate valuable in electrical applications, including: wiring, power transmission, and electronic components. Irons melting point is 1538 C. Table 1 below shows the melting points of common types of iron and iron-based alloys. A table showing the melting points for common iron-based materials. Iron, due to its ability to be used in the creation of numerous different alloys, is used for a variety of applications in different industries due to the exceptional properties that can be achieved with the right alloying elements. The strength, ductility strength, malleability, and longevity of iron alloys is highly valuable from structural components, bulk packaging like drums, and decorative and artistic endeavors such as ornamental gates and architectural elements. The presence of iron and iron-based alloys (mainly steels) just about everywhere you look underscores its significance in modern society. It is a core part of every citys critical infrastructure and the tools and transportation we use in everyday life. Once extracted from ore, iron can be further processed into various alloys and forms to fulfill a variety of application needs. Some of the types of iron and iron alloys are listed below: Pig iron is a crude form of iron obtained directly from a blast furnace. It contains high amounts of carbon (typically 34.5%) and other impurities. The steel industry primarily utilizes pig iron as a raw material for producing steel through further refining processes. The cost of pig iron is influenced by iron ore and coke (coal-based fuel) prices, along with market demand for steel products. Pig iron has a metallic luster, high density, and melting point similar to steel. It is ferromagnetic and relatively strong but brittle, making it unsuitable for direct use in most applications. Pig iron is not used for finished products and instead is melted and refined to adjust its composition and properties for further processing into steel or cast iron products. Wrought iron is a pure form of iron with a very low carbon content (less than 0.081%). Historically valued for its malleability, ductility, corrosion resistance, and aesthetic appeal, wrought iron is used primarily in ornamental gates, fences, and architectural elements. The production process for wrought iron is specialized, which results in higher cost compared to other iron types like cast iron and pig iron. It has a higher melting point, typically around 1480 C. Wrought iron is not as strongly magnetic as steel, and is softer. That can make it better suited than steel for decorative applications, but less suitable for load-bearing structures. Cast iron is an iron-carbon alloy containing more than 2% carbon along with silicon and other elements. It is valued for its excellent casting properties, wear resistance, and damping capacity. Cast iron finds extensive use in applications where strength and hardness are crucial, such as in engine blocks, pipes, and heavy machinery parts. The automotive manufacturing, construction, and cookware industries are major users of cast iron products. Compared to steel, cast iron can be more cost-effective due to its lower melting point and ease of casting. Cast iron has a metallic luster but is less shiny than steel. Additionally, while it is more more brittle bri materials structure. When fractured, the graphite flakes create a dull grey appearance on the fracture surface, giving gray iron its distinctive gray color and desirable properties. It has a metallic luster but is less shing than steel and ductile iron. Gray iron has a moderate melting point, typically around 1140 C to 1200 C. It is ferromagnetic and exhibits good compressive strength. Gray iron has a moderate melting point, typically around 1140 C to 1200 C. It is ferromagnetic and exhibits good compressive strength. machinery, construction, and manufacturing utilize gray iron for components that require good wear resistance and vibration damping. Compared to other cast iron, gray iron is cost-effective due to its ease of casting and the abundant raw materials from which it is made. Ductile iron contains graphite nodules in pearlite and ferrite that enhance its ductility and toughness compared to gray iron. Ductile iron combines the strength and durability of cast iron with the ductility and impact resistance of cast steel. Furthermore, ductile iron has a metallic luster similar melting point to other types of cast iron, typically around 11501200C. has the lowest melting point of the types of iron mentioned here. This combination of properties makes ductile iron include: the automotive, machinery, pipe fittings, and water infrastructure industries. White iron is another type of cast iron, characterized by its cementite and pearlite microstructure When fractured, the fracture surfaces of the material are white iron. It is denser and has a higher melting point, typically around 12601350C 1370 C to 1500 C. White iron is ferromagnetic and exhibits high hardness and abrasion resistance. Despite its brittleness, white irons exceptional wear properties make it indispensable for applications like crusher liners, grinding balls, and chute liners in heavy-duty industries like mining and mineral processing. Steel is an alloy primarily composed of iron and carbon, as well as other alloying elements such as: manganese, chromium, or nickel. Steel typically contains varying concentrations of percentages of concentrations of percentages of concentrations of percentages of concentrations of percentages. Steel typically contains varying concentrations of percentages of concentrations of percentages of concentrations of percentages of concentrations of percentages of concentrations of percentages. further be tailored to satisfy specific applications in industries ranging from construction and manufacturing to automotive and aerospace. Different types of steel include plain carbon steel, low alloy steel stainless steel, tool steel alloys are known for their exceptional strength and versatility, which makes them one of the most widely used materials globally. Other desirable properties of steel include: a shiny metallic luster, potentially high malleability, and ductility (depending on the type of steel), and strength-to-weight ratio. Its melting point ranges between 14251540C 1370 C and 1510 C, and most types of steel are ferromagnetic. Steel cost depends on factors like: alloy composition, production methods, and market demand. To choose the application, including: mechanical properties, corrosion resistance, and dimensional stability. Based on these requirements, consider factors such as: costeffectiveness, availability of raw materials, and processing complexity. Take into account environmental factors like exposure to moisture, chemicals, temperature variations, stress, and cyclic stress selecting an iron alloy that offers suitable corrosion resistance and durability for the specific conditions. It is also important to consider compliance with industry standards and regulations governing the use of iron materials. With these items considered, evaluate the different types of irons, steels, and other iron-based alloys, and choose the most suitable one. Iron finds extensive use across a diverse range of industries due to its strength and other beneficial properties. The industries that rely most heavily on iron include: Construction: Iron, in the form of steel alloys, is used in structural frameworks, beams, columns, and rebar in buildings, bridges, and infrastructure projects. Manufacturing: Iron and steel alloys serve as key components in manufacturing processes due to their use in: machinery, tools, and equipment. Transportation: Iron and steel alloys serve as key components in manufacturing processes due to their use in: machinery, tools, and equipment. Transportation: Iron and steel alloys serve as key components in manufacturing processes. steel are used in the manufacture of vehicles, including cars, trucks, trains, and bicycles, as well as in infrastructure for: roads, railways, and airports. Infrastructure such as: roads, bridges, tunnels, and dams. Energy Generation: Iron and steel is used in power generation equipment, including: turbines, transformers, and transmission lines. Automotive: Iron, cast iron, gray iron, steel, and more are utilized in the automotive industry for engine blocks, chassis components, and other structural parts. Aerospace: Iron and its alloys are used in aircraft components, such as: landing gear, structural elements, and engine parts. Shipbuilding: Iron is employed in the construction of ships, submarines and weldability; corrosion resistance is usually enhanced by coatings or alloying in specific marine-grade steels. and corrosion resistance. Machinery and Equipment: Iron, gray iron, white iron, and steel are all integral to the manufacturing of industrial machinery, tools, pumps, and engines. Packaging: Iron is used in the products. Medical Equipment: Iron and steel alloys are used in the manufacturing of medical devices, surgical instruments, and diagnostic equipment. Agriculture: Iron is used in: farm machinery, irrigation systems, and agricultural tools. Mining: Iron, particularly white iron and steel are utilized in the construction of electronic devices including: computer hardware, appliances, and telecommunications infrastructure. Choosing the best iron or steel supplier involves evaluating key factors such as: product quality, delivery reliability, and customer service. Ensure that the supplier involves evaluating key factors such as: product quality, delivery reliability, and customer service. Ensure that the supplier involves evaluating key factors such as: product quality materials that meet your standards and specifications. Assess their track record in meeting deadlines and maintaining supply levels to avoid disruptions. Look for a supplier with responsive customer service and efficient communication to address inquiries and resolve issues promptly. Consider factors, you can select a reliable raw material supplier that supports the success and efficiency of your operations. Thomas, a Supplier Discovery Platform, has over 150 suppliers in Iron. To learn more, view our Iron Suppliers for your operations. Thomas, a Supplier biscovery Platform, has over 150 suppliers in Iron. To learn more, view our Iron Suppliers for your operations. for metal gaskets. Iron-based gaskets provide a secure and lasting seal and help contribute to the efficiency and safety of mechanical systems and equipment. The word iron refers to pure iron or iron alloys with very low carbon content typically between 0.02% and 2.1%, and may include other elements such as manganese, chromium, or nickel. Steel is an alloy primarily composed of iron and carbon, often with other elements added in . Steel is stronger and more versatile than pure iron and is suitable for a wider range of applications. From being a crucial building block of steel to nourishing plants and helping carry oxygen in your blood iron is always busy helping sustain life on Earth. Iron is a brittle, hard substance, classified as a metal in Group 8 on the Periodic Table of the Elements. The most abundant of all metals, its pure form rapidly corrodes from exposure to moist air and high temperatures. Iron is also the fourth most common element in Earth's crust by weight and much of Earth's core is thought to be composed of iron. Besides being commonly found on Earth, it is abundant in the sun and stars, according to the Los Alamos National Laboratory. Iron is crucial to the survival of living organisms, according to the Los Alamos National Laboratory. Iron is crucial to the survival of living organisms, according to the Los Alamos National Laboratory. Iron is crucial to the survival of living organisms, according to the Los Alamos National Laboratory. Iron is crucial to the survival of living organisms, according to the Los Alamos National Laboratory. Iron is crucial to the survival of living organisms, according to the Los Alamos National Laboratory. Iron is crucial to the survival of living organisms, according to the survival of living organisms, according to the survival of living organisms. protein in blood that carries oxygen from the lungs to the tissues in the body. Ninety percent of all metal that is refined these days is iron, according to the Royal Society of Chemistry. Most of it is used to make reinforced concrete. Stainless steel, which contains at least 10.5 percent chromium, is highly resistant to corrosion. It is used in kitchen cutlery, appliances and cookware such as stainless steel pans and skillets. The addition of other elements can provide steel with other useful qualities. For instance, nickel increases its durability and makes it more resistant to heat and acids; manganese makes it more durable, whereas tungsten helps it maintain hardness at high temperatures, according to Jefferson Lab.You may like Just the factsAtomic weight (average mass of the atom): 55.845Density: 7.874 grams per cubic centimeterPhase at room temperature: SolidMelting point: 2,800.4 degrees Fahrenheit (1,538 91.754 percent)(Image credit: Greg Robson/Creative Commons, Andrei Marincas Shutterstock) History and properties of ironArcheologists estimate that people have been using iron for more than 5,000 years, according to Jefferson Lab. In fact, it turns out that some of the most ancient iron known to humans literally fell from the sky. In a study published in 2013 in the Journal of Archeological Science, researchers examined ancient Egyptian iron beads that date to around 3200 B.C. and found that they were made from iron meteorites. The Old Testament in the Bible also mentions iron multiple times, according to Los Alamos National Laboratory. Iron is mostly obtained from minerals hematite and magnetite. In smaller degrees, it can also be obtained from the minerals taconite, limonite and siderite, according to Jefferson Lab. Iron has four different patterns, according to Los Alamos National Laboratory. Those forms are called ferrites, known as alpha (which is magnetic), beta, gamma and omega. Iron is an important nutritional deficiency, the most common nutritional deficiency, can cause anemia and fatigue that affects the ability to perform physical work in adults. It can also impair memory and other mental function in teens, according to the Centers for Disease Control and Prevention. Women who have iron deficiency while pregnant are at an increased risk of having small and early babies, the CDC warns. There are two types of dietary iron: heme iron which is the more readily absorbed type of iron is found in meat, fish and poultry, whereas non-heme iron which is also absorbed but to a lesser extent than heme iron, the ARC reports, adding that foods rich in vitamin C such as tomatoes or citrus fruits can help absorb people absorb non-heme iron. Who knew? Blood is red because of the interaction between iron and oxygen, according to the University of California, Santa Barbara. The blood looks red because of the way in which the chemical bonds between the two elements reflect light. Pure iron is actually soft and malleable, according to the University of Denver.In 2007, researchers discovered a huge plume of iron-rich water emanating from hydrothermal vents in the southern Atlantic Ocean. Iron is necessary for the growth of phytoplankton tiny marine bacteria that use carbon dioxide from the atmosphere to fuel photosynthesis. Some researchers have therefore argued that fertilizing the oceans with extra iron could help suck up excess carbon dioxide. But a study published online in November 2010 in the Proceedings of the National Academy of Sciences found that this might not be such a good idea, as all this extra iron could actually trigger the growth of toxin-producing algae that contribute to the contamination of marine wildlife. About 90 percent of all metal that is refined today is iron, according to the Royal Society of Chemistry. Iron is a crucial component of a meteorite class known as siderites, according to Los Alamos National Laboratory. The pillar is about 23.75 feet (7.25 meters) high and measures 15.75 inches (40 centimeters) in diameter. Despite being exposed to weather conditions, the pillar has not corroded much due to its unique composition of metals. Examples of iron-rich foods include meat, such as beef, turkey, chicken and pork; seafood, such as shrimp, clams, oysters and tuna vegetables, such as spinach, peas, broccoli, sweet potatoes and string beans; bread and cereals, such as bran cereals, whole wheat bread and enriched rice; other foods, such as beans, lentils, tomato paste, tofu and molasses, according to the American Red Cross. The surface of Mars is red due to a large amount of iron oxide (rust) on its surface, according to Nature. Mars has more than twice as much iron oxide in its crust than Earth. Earth's solid inner and liquid outer cores are primarily composed of iron (approximately 85 percent and 80 percent by weight, respectively). The electric current generated by the liquid iron creates the magnetic field protecting Earth, according to NASA. Iron is also found in the cores of all of the planets in the Solar System. Iron is the heaviest element formed in the cores of stars, according to JPL. Elements heavier than iron can only be created when high mass stars explode (supernovae). The Latin name for iron is ferrum, which is the source of its atomic symbol, Fe. The word iron is from an Anglo-Saxon word, iren. The word iron is possibly derived from earlier words meaning "holy metal" because it was used to make the swords used in the Crusades, according to WebElements. Current researchIron has been the subject of numerous medical studies, some of which show that high levels of iron in the blood may in fact be linked to an increased risk of Albert Einstein College of Medicine of Yeshiva University in New York. "And whether that's a biomarker for something else going on is unclear," Wylie-Rosett told Live Science. (Ferritin is a type of protein that stores iron, while the ferritin test measures the amount of iron in your blood.) In a study of more than 1,900 Finnish men ages 42 to 60 years, published in 1992 published in the journal Circulation, researchers found a link between high levels of iron and increased risk of heart attack. In a more recent study, published online in January 2014 in the Journal of Nutrition, researchers found that heme iron, found in meat, increased the risk for coronary heart disease by 57 percent, but no such association was found between non-heme iron and coronary heart disease risk. Interestingly, recent research has also linked the accumulation of iron in the brain to Alzheimer's disease. In a study published in August 2013 in the Journal of Alzheimer's Disease, researchers found that the amount of iron in the hippocampus an area of the brain associated with the formation of memories was increased and associated with tissue damage in the hippocampus area in people with Alzheimer's disease, but not in healthy older people. "The accumulation of iron in the brain may be influenced by modifying environmental factors, such as how much red meat and iron dietary supplements we consume and, in women, having hysterectomies before menopause," study author Dr. George Bartzokis, a professor of psychiatry at the Semel Institute for Neuroscience and Human Behavior at UCLA, said in a statement. Iron deficiencies have also been linked with depression, according to a 2017 study published in the Journal of Psychiatric Research by a group of Australian researchers who were trying to find a link between genetics, iron levels and depression, especially with teenagers. The researchers found that although there is a link between the two. The researchers used data available from twin studies and looked at a variety of factors while comparing teenaged twins to adult twins. The link between iron levels and depression is most likely to be observed during periods of time when the body requires higher amounts of iron such as during growth spurts. A 2017 article published in the European Journal of Nutrition by a research group from from group taking the group experienced a significantly greater improvement of PPD symptoms than the group taking the placebo. Additional reporting by Rachel Ross, Live Science ContributorGet the worlds most fascinating discoveries delivered straight to your inbox. If you value your time, health and privacy DMV IRON GYM is the gym for you! Are you ready for the best workout of your life, in our world class facility with the best equipment designed to achieve results in a much faster period of time? Big box gyms are designed to be busy, cheap, and discourage you from coming. This keeps you hooked, spending money, not showing up, and not getting results. You don't have to be a professional bodybuilder/ athlete to join DMV IRON GYM Just be serious about your fitness and committed to see results. Time and health are your best asset! Join DMV IRON GYM and become a better version of yourself in a record time. Open 24 X 7 We understand that your fitness goals can sometimes be a round-the-clock endeavor, and we are committed to providing you with the flexibility and convenience you need. Locations 6763-R Wilson Blvd, Falls Church, VA 22044 5424 Eisenhower Ave, Alexandria, VA 22304 1776 E Jefferson St #103, Rockville, MD - COMING SOON Science Earth Science, Geologic Time & Fossils Earth Sciences iron (Fe), chemical element, metal of Group 8 (VIIIb) of the periodic table, the most-used and cheapest metal. Element Properties atomic number 26atomic weight 55.847 melting point 3,000 C (5,432 F)specific gravity 7.86 (20 C)oxidation states +2, +3, +4, +6 electron configuration [Ar] 3d64s2 Study how iron ore is mined with explosives and crushed and concentrated with remote-controlled machines ron ore mining at Kiruna, Sweden. See all videos for this article ron makes up 5 percent of Earths crust and is second in abundance to aluminum among the metals and fourth in abundance behind oxygen, silicon, and aluminum among the elements. Iron, which is the chief constituent of Earths core, is the most abundant element in Earth as a whole (about 35 percent) and is relatively plentiful in the Sun and other stars. In the crust the free metal is rare, occurring as terrestrial iron (alloyed with 23 percent nickel) in basaltic rocks in Greenland and carbonaceous sediments in the United States (Missouri) and as a low-nickel meteoric iron (57 percent nickel), kamacite. Nickel-iron, a native alloy, occurs in terrestrial deposits (2164 percent nickel) and in meteorites as taenite (6275 percent nickel) and in meteorites as taenite (6275 percent nickel). classified as iron, iron-stone, or stony according to the relative proportion of their iron and silicate-mineral content. Iron is also found combined with other elements in hundreds of minerals; of greatest importance as iron ore are hematite (ferric oxide, Fe2O3), magnetite (triiron tetroxide, Fe3O4), limonite (hydrated ferric oxide hydroxide, FeO(OH)nH2O), and siderite (ferrous carbonate, FeCO3). Igneous rocks average about 5 percent iron content. The metal is extracted by smelting with carbon (coke) and limestone. (For specific information on the mining and production demonstrated reserves 2006 (metric tons)*, ** % of world demonstrated reserves *Estimated. **Iron content. ***Detail does not add to total given because of rounding. Source: U.S. Department of the Interior, Mineral Commodity Summaries 2007. China 520,000,000 30.8 15,000,000,000 8.3 Brazil 300,000,000 17.8 41,000,000,000 22.8 Australia $270,000,000 \ 16.0 \ 25,000,000,000 \ 13.9 \ India \ 150,000,000 \ 8.9 \ 6,200,000,000 \ 8.9 \ 6,200,000,000 \ 1.4 \ Sweden \ 24,000,000 \ 1.4 \ 5,000,000,000 \ 2.8 \ 54,000,000 \ 2.8 \ South Africa \ 40,000,000 \ 2.8 \ South Africa \ 40,000,$ Iran 20,000,000 1.2 1,500,000,000 0.8 Venezuela 20,000,000 0.8 Venezuela 20,000,000 0.5 other countries 43,000,000 0.5 othe iron in the human body is about 4.5 grams (about 0.004 percent is in the form of hemoglobin, which transports molecular oxygen from the lungs throughout the body; 1 percent in the various enzymes that control intracellular oxidation; and most of the rest stored in the body (liver, spleen, bone marrow) for future conversion to hemoglobin. Red meat, egg yolk, carrots, fruit, whole wheat, and green vegetables contribute most of the 1020 milligrams of iron required each day by the average adult. For the treatment of hypochromic anemias (caused by iron deficiency), any of a large number of organic or inorganic iron (usually ferrous) compounds are used. Iron, as commonly available, nearly always contains small amounts of carbon, which are picked up from the coke during smelting. These modify its properties, from hard and brittle cast irons containing up to 4 percent carbon to more malleable low-carbon steels containing less than 0.1 percent carbon. Three true allotropes of iron in its pure form occur. Delta iron, characterized by a body-centred cubic crystal structure, is stable above a temperature of 1,390 C (2,534 F). Below this temperature there is a transition to gamma iron, which has a face-centred cubic (or cubic close-packed) structure and is paramagnetic (capable of being only weakly magnetized and only as long as the magnetizing field is present); its ability to form solid solutions with carbon is important in steelmaking. At 910 C (1,670 F) there is a transition to paramagnetic (i.e., capable of being permanently magnetized), indicating a change in electronic structure but no change in crystal structure. Above 773 C (its Curie point), it loses its ferromagnetism altogether. Alpha iron is a soft, ductile, lustrous, gray-white metal of high tensile strength. Facts You Should Know: The Periodic Table Quiz Pure iron is quite reactive. In a very finely divided state metallic iron is pyrophoric (i.e., it ignites spontaneously). It combines vigorously with chlorine on mild heating and also with a variety of other nonmetals, including all of the halogens, sulfur, phosphorus, boron, carbon, and silicon (the carbide and silicon of air, iron in the +2 oxidation state is obtained. With air present or when warm dilute nitric acid is used, some of the iron goes into solution as the Fe3+ ion. Very strongly oxidizing mediumsfor example, concentrated nitric acid or acids containing dichromatepassivate iron (i.e., cause it to lose its normal chemical activity), however, much as they do chromium. Air-free water and dilute air-free hydroxides have little effect on the metal, but it is attacked by hot concentrated sodium hydroxide. Natural iron is a mixture of four stable isotopes: iron-57 (2.19 percent), iron-57 (2.19 percent), iron-57 (2.19 percent), iron-58 (0.33 percent). of a phenomenon known as the Mssbauer effect (the phenomenon of a gamma ray being absorbed and reradiated by a nucleus without recoil). Although the Mssbauer effect has been a major research tool for the chemist. In the case of iron the effect depends on the fact that the nucleus of iron-57 can be excited to a high energy state by the absorption of gamma radiation of very sharply defined frequency that is influenced by the oxidation state, electron configuration, and chemical environment of the iron atom and can thus be used as a probe of its chemical behaviour. The marked Mssbauer effect of iron-57 has been used in studying magnetism and hemoglobin derivatives and for making a very precise nuclear clock.

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