SWE 573 - Nutrasistant Application

Software Requirements Specifications

Boğaziçi University
M.S. in Software Engineering
SWE 530 Software Design Process Course

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1. Introduction

1.1 Purpose

The purpose of this document is to build the online NutrAsistant Food Related Information Sharing Social Network Web Application software to provide a crowdsourcing online platform which individuals and food providers can contribute by sharing recipes , rating and commenting on them.

1.2 Intended Audience

The system requirements specification document describes what the system is to do, and how the system will perform each function. The audiences for this document include the system developers and the users. The system developer uses this document as the authority on designing and building system capabilities. The users review the document to ensure the documentation completely and accurately describes the intended functionality.

This version – version 1.0 - provides general descriptions of the system. The system developer should review the document to ensure there is adequate information for defining an initial design of the system. The users should review the document to affirm the features described are needed, to clarify features, and to identify additional features needed within the system.

The next version – version 2.0 – will be the result of more detailed requirements analysis. When Version 2.0 is written, the system developer and users will be asked to review this document. The document is structured to follow IEEE 830-1998 standards for recording system requirements.

1.3 Glossary - Acronyms and Abbreviations

BOUN : Boğaziçi Univercity
SWE : Software Engineering Master Program Of BOUN
SWE 573: Software Development Practice

NutrAsistant : The name of this project and software to be.

DB or db refers to the database of the application.

OtR : Object to requirement reducing

Web Application : An application program that is stored on a remote server and delivered over the Internet through a browser interface.

Database , A collection of related data stored in one or more computerized files in a manner that can be accessed by users or computer programs via a database management system.

Server – A central computer (server) which provides services such as file storage, printing, and communications in a network computing system

Client – A computer process that requests a service from another computer and accepts the server's responses / the individual computers in a network computing system

System - A composite of equipment, skills, and techniques capable of performing or supporting an operational role or both. A complete system includes all equipment, related facilities, material, software, services and personnel required for its operation and support to the degree that it can be considered a self-sufficient item in its intended operational environment.

Requirement -A statement of need for some aspect of a system, often elicited directly from a stakeholder or captured from a source document

System Requirement - A condition or capability that must be met or possessed by a system or system component to satisfy a condition or capability needed by a user to solve a problem.

Software requirement – (1) A software capability needed by a user to solve a problem to achieve an objective; (2) A software capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed document.

Functional requirement: A statement of a piece of required functionality or a behavior that a system will exhibit under specific conditions. These include inputs, outputs, calculations, external interfaces, communications, and special management information needs. Functional requirements are also called behavioral requirements because they address what the system does.

Use cases - A task analysis technique often used in software engineering. For each module of a system, common tasks are written up with the prerequisites for each task, the steps to take for the user and the system, and the changes that will be true after the task is completed. Use cases are especially useful for making sure that common tasks are supported by the system, that they are relatively straightforward, and that the system architecture reflects the task structure.

User class - A group of users for a system who have similar characteristics and requirements for the system.

User interface – A user interface is what you have to learn to operate a machine. For example, the graphical user interfaces (GUIs) -- windows, icons, and pop-up menus have become standard on personal computers.

Authentication - The procedure (essentially approval) used by the approval authority in verifying that specification content is acceptable. Authentication does not imply acceptance or responsibility for the specified item to perform successfully.

1.5 Document Conventions

This document follows the IEEE standard. Bold faces used to emphasize section and subsection headings. Highlighting is to point out words in the glossary and italicized text used to label and recognize diagrams and tables.

1.6 References

Project Github Repository :
https://github.com/BounSweFerhatSal/swe573

IEEE 830-1998 :
https://standards.ieee.org/standard/830-1998.html

2. Overall Description

2.1 Product Perspective

NutrAssistant is a nutritional assistant, an awareness tool and a “healthy food” based social network which connects food providers, food consumers who are actually every human being especially the ones interested in healthy food.

According to Wikipedia, “food” is any substance consumed to provide nutritional support for an organism. It’s a fact that we basically consume food in order to maintain

life and growth. Finding food was one of the biggest challenges for humanity in the hunter-gatherer era before moving to established agriculture. However, instead of finding food, with the gradual development of agriculture and technology, the main problem has now turned into consuming the healthy and the right amount of food. The other undeniable fact about food is it consists of many kinds of basic nutrients such as carbohydrates, fats, proteins, and vitamins which are good for our bodies if we consume them in the right balance, however they can be deadly harmful if we exaggerate the amount of them or quit consuming some of them completely. Therefore we have to learn what is the right amount of different nutrients and how can we balance them.

The main idea behind the Nutrassitant is to provide this important and beneficial information to the users in an easy manner. The food we consume is actually a result of a production process, such as cooking at home or in a restaurant or producing packaged food in a factory. This means we are not directly consuming the food as separate nutrient substances instead we are eating the last state of recipes which are a mix of them. Therefore, Nutrasistant must focus on recipes rather than basic nutrients while providing data about food.

Recipes are actually the ingredients of foods, and the process of cooking or preparing them for eating, but in most cases, the nutrition data of food is not related to the preparing process, it only about the amount of nutrients substances. Recipes can be created by individuals or professional food providers such as restaurants or factories hence if people or providers share the recipes with the community, every individual can access the necessary healthy food information for their own.

The issue that we need to underline is that the concept of healthy food is unique for each individual. Each individual's height, weight, age, gender, metabolic rate, daily activity amount, more importantly, allergies, acute or chronic diseases determine what is the healthy food for that individual. Therefore, Nutrasistant must first require the individual to identify himself correctly.

In this way, individuals can learn about which foods are ok for them or which are dangerous for their situations. At the same time, food providers can produce special recipes for a group of consumers who share common problems or common targets.

Consequently, Nutrassitant is a software that mainly focuses on healthy food, nutrient data of food, and sharing the data of food and aims to provide the awareness of consuming healthy food and make it easier to find individuals feature-based healthy food.

2.2 Product Functions

The product functions of the system include services and utilities both for individual users and food providers.

For both usage types , the NutrAsistant provides basic user management functions such as registering to the system, logging in and logging out, changing the password, etc.

For individual users, the NutrAsistant provides an efficient and easy to use way to define themselves by :

- Specifying their interest and restrictions about foods, specifying personal data such as height, weight, age, gender, metabolic rate, daily activity amount,
- Specifying personal medical data which consist of diseases that they have such as allergies, chronic diseases like diabetes, celiac disease, cancer, gastritis, and ulcer
- Specifying their social status such as being married and having kids, etc.

This information collection aims to meet the appropriate foods and recipes with the user according to their criteria by recommending recipes and food providers to them, which is actually the main purpose of the NutrAssistant Project. On the other hand, NutrAssistant provides an efficient way for the users to contribute to the community by creating and sharing recipes, commenting and rating about the recipes, ingredients or cooking styles.

The system itself provides a crucial functionality to the users which is calculating the approximate calorie values of any food or recipe based on their ingredients and providing the information on how many calories they should daily consume based on their personal data such as height, weight, gender, age.

For food provider users, the NutrAsistant provides the functionality of creating virtual stores where they can publish : what kind of foods they are providing such as vegetarian, vegan, kids friendly, chinese, italian , kebabs. NutrAsistant also allows them to create daily and monthly menus which provide the exact information of the ingredients so the consumers can investigate the calorie value of a menu or the appropriateness of the ingredients for themselves.

From the social network perspective the NutrAsistant provides the functionality of following any individual user or food providers online stores, commenting to their menus and recipes and rating them. The system also provides notifications to users about newly created recipes and menus by the user which the user follows, newly created food stores in the same area which provides recipes that the user is interested in.

2.4 Assumptions and Dependencies

1. The users have sufficient knowledge of computers and basic internet browsing.
2. The users are familiar with the Social Network related terminology like creating profiles, following users ,commenting,rating etc.
3. The users know the English language, as the user interface will be provided in English.
4. Every user has an active email address.
5. Related software dependencies (Application Server, Database,etc.) are installed and accessible on the server.

2.5 Operating Environment

The NutrAssistant shall operate in all famous Web browsers such as Chrome, Firefox,IE and any modern day browsers.

3. Specific Requirements

3.1 Functional Requirements

1-User Management :

1.0- The system should separate users into two groups: "back-office users" and "application users". In this document "user" words are used a shorthand of "application users". When a requirement is about a back-office, it must specify it clearly.

1.1- The system should allow users to register themselves on the system with mandatory information below :

- User Name: can be any word up to a maximum of 50 chars.
- e-Mail address: must be in the valid email address format, ex: abcdef@mlprovider.com ...
- Password: must match the criteria specified in the non-functional security requirements.

1.2- The system must approve the email address by sending a link to the newly registered user which includes confirmation data generated by the system. When the user clicks the link, it

should go to the confirmation page of the web application. Confirmation page must show a success message then must redirect to the user's profile page after 10 seconds automatically.

1.3- User should be able to change the password whenever he or she wants. To change the password, the user must provide the current password.

1.4- The system should provide a way to define a new password when the user forgets the password.

1.5 - Back-office users can not register themselves, they must be registered by administrators using the related admin panel. The mandatory info is the same as 1.1, but the user group is static and equals "back-office-user".

1.6- Otr : Back-office users can be assigned to roles by an administrator such as "call-center", "data-provider" etc..

1.7- The system must contain at least one back-office user with the administrator role when deployed to the production server.

1.8- All users must log in to the system to access the application.

1.9- Users can log-out the system anytime.

2-Nutrition Data Management

2.1- Back-Office users should be able to add nutrition substance definitions (ex: pateto, white bread,somon fish etc..) including their composition as basic molecules such as fats, carbohydrates, proteins, vitamins, etc. and their corresponding calorie values.

2.2- Back-Office users should be able to define the cooking methods and to match them with nutrients to assign them different calorie values. For example the calorie value of 100 grams of potato maybe 250 Kcals but when it is cooked by the frying method by palm oil the calorie value may be assigned as 500 Kcals. Moreover, they should be able to assign calorie values for the raw state and cooked/or packaged state.

2.3- Back office users should be able to define the benefit of nutrition about how they affect human bodies, such as which body functions are affected in a positive manner, for example, nutrition x is a plus for insulin production of liver, and as reverse which functions are affected negatively, for instance, nutrition y decreases the level of serotonin hormone.

2.4- Back-office users should be able to define new cooking methods.

2.5- Back-office users should be able to define new generic food types (labels) for stores such as meat, fish, Chinese, vegan, kebab, sushi, etc.

2.6- USDA can be used as the resource for macro/micronutrients

3-Recipes

3.1- All users (not back-office users) should be able to create new recipes using the nutritions saved on the system. Each recipe must include which nutrient used in which amount and which cooking method is used. Recipes must have a name and a description and *can contain an image* and should contain one or more labels(look at 2.5)

3.2- OtR : Users should be able to set the sharing status of recipes as public or private or protected which means it is shared for only some specific users.

3.3- Nutritional value of these recipes should be calculated approximately by the system immediately after recipes are created, using the ingredients calorie values and the methods used for cooking.

3.4- Recipes should be able to be accessed by a search, and every recipe should be shown by a name and a description and if it has an image. All details should be shown in a detailed page.

3.5-Users should be able to rate the recipes with a scoring range from 1-5.

3.6- Users should be able to comment on recipes but adding comments on comments should not be provided instead all comments must be done under recipe.

3.7- Users should be able to tag the recipes as wikidata items and the system should have to save the item tag as a label and ID value pair.

4-User Profiles

4.1- Users should be able to specify their food preferences by using the labels.(look at 2.5)

4.2- Users should be able to specify what allergies they have.

4.3 Users should be able to specify what diseases (diabetes Mellitus, celiac disease, glucose intolerance, Colon cancer, Gastritis, ulcer) they have.

4.4- Users should be able to specify their dietary restrictions. Restrictions can be ingredients (exg: pea-nut), cooking styles (exg: fried) and labels (exg: pastry)

4.5- Users should be able to specify their personal attributes such as height, weight, age, gender, metabolic rate, daily activity amount.

4.6- Users should be able to specify their social state such as married/ single , have kids , kids count , kid ages.

4.6- User should be able to specify their locations as Country, State, City, Town

4.6- Users should be able to upload their profile pictures.

4.7- Users should be able to follow /unfollow other user-profiles and Food Provider Stores

4.8- Users should be able to see how many users they are following and how many users are following them. Users should be able to see the full list of followers/ following.

4.9- User profile pages can be accessed by searching the user with the name publicly. But the public user profile pages should not contain any personal info such as allergies, diseases, addresses. Public profile pages should show food preferences, followers list, and the recipes the user has created (see 3.2).

5-Food Providers

5.1- Every food provider must be registered as an individual user first. (as the owner or the manager)

5.2- Users should be able to create and manage one or more food provider stores. To create a Store with a Name, a Phone Number, address (Country, State, City, Town), a description text and at least one main area of food such as meat, fish, vegan, etc must be given.

5.3- Users should be able to specify multiple food types (labels) that their store is providing. (look at Req.No:2.5)

5.4- OtR :Users should be able to specify work hours for their stores.

5.5- Users should be able to create and publish daily and monthly menus. A Menu consists of a name, one or more labels, one or more recipes but menus can not contain a direct ingredient nutrient substance such as sugar, salt, protein, etc...

5.7- Store owner users should be able to see how many users they are following their store and they should be able to see the full list of followers.

5.8- Users should be able to rate the menus with a scoring range from 1-5.

5.9- Users should be able to comment on menus.

6-Recommendations

6.1- System should be able to recommend foods(recipes) based on their preferences and restrictions, menus or food providers based on their address information.

6.2- Users should be able to see the recommendation from their profile pages and from a separate page which can be opened from a toolbar link.

7-Notifications

7.1- System should provide notifications to users about newly created recipes and menus by the user which the user follows, newly created food stores in the same area which provides recipes that is the user interested in.

7.2- System should provide notifications to users about and newly given rates to recipes and menus

7.3- The system should provide notification to users for every new follower. Such user "John Doe" started to follow you.

7.4- The subscription and notification should be handled using W3C Activity Streams 2.0.

8- Calorie Tracing & Meals

8.1 Users should be able to create meals for themselves through adding existing recipes or directly adding ingredients to meals. For example a meal can consist of “Japan Omelette” + 100 grams of Bacons and 2 tomatoes.

8.2 System should extract all ingredients in the meals. If recipes are included in the meal , the system should calculate the total amount of all different ingredients in all recipes and directly given ingredients. For example , this meal contains 15 grams of parmesan cheese, 200 grams of cow meat , 100 grams of wheat, 1 apple, 5 grams of salt..)

8.3 System should extract the nutritions of all ingredients in the meal as micro and macro nutrients and calculate the total amount of them. For example , this meal contains 100 grams of Carbohydrates + 50 grams of proteins + 60 grams of at and 1 mg of follicasid in total.

8.3 System should calculate the total calorie value of a meal based on its ingredients and their cooking styles. (Look at 3.1)

3.2 Non-Functional Requirements

3.2.1 Performance and Scalability Requirements

- The landing page’s response time shall be 5 seconds or less in any browser over a DSL connection.
- Application shall have enough storage capacity for 10.000 users.
- Landing page shall have bandwidth capacity for 2000 users

- When a transaction request is sent, the system shall respond in 10 seconds with a message.

3.2.2 Compatibility Requirements Requirements:

- System shall support these browsers:
    - Microsoft Windows 10
        - Google Chrome (latest stable version)
        - Firefox (latest stable version)
        - Microsoft Edge
        - Microsoft Internet Explorer 11
    - MacOS 10.12 and newer
        - Google Chrome (latest stable version)
        - Safari

3.2.3 Reliability, Availability, and Maintainability Requirements

- The system shall be available to users 99 percent of the time every day.
- Backups shall be defined to 1 day interval.

3.2.4 Accessibility

- Images shall have explanatory alternative text.
- Links shall have significant titles.
- Forms shall have labels for fields.
- Nested tables shall not be used.
- Applications shall not have heavy content.
- Application shall have consistent navigation mechanism.
- Application shall have max. 3 different text fonts.
- Texts shall have adequate line length and height.
- White spaces shall be used.
- A search option shall be provided.

3.2.5 Security Requirements

- Encryption of Data: All external communications between the system's data server and clients must be encrypted via HTTPS.
- Administration: Access permissions for application data may only be changed by the system's data administrator
- Password requirements – A User's password must be at least 6 chars length, at least one special character.
- Inactivity timeout – After 20 minutes of inactivity of the user, the session must expire.
- The system shall ensure that data is protected from unauthorized access.

3.2.6 Localization Requirements

- The date format shall be as follows: date.month.year.
- The system language shall be English.

3.3 Use Cases

Blank for now……

3.4 External Requirements

3.4.1 Personal Data Privacy

GDPR is a regulation that requires businesses to protect the personal data and privacy of EU citizens for transactions that occur within EU member states. Since NutAssistant is aiming to sell books all over the the European Union the regulations should be implemented. Therefore any personal contact data such as email address and location (physical address) and any personal medication data such as diseases and allergies must be private to all users.

3.5 Hardware Requirements

3.5.1 : Data Storage :

3.5.1.1 : Online Storage - The system needs to be able to store hundreds of megabytes of data on demand. The potential for needing Gigabytes of data storage capacity is also in the realm of possibilities. Further requirements gathering is needed to get real-world estimates of such data storage needs.

3.5.1.2 : Near-line Storage – All User and Application data as well as software installation and configuration files must be fully backed up weekly. Further, secure, offsite storage will be performed on a weekly basis.

3.5.2 : Networking

3.5.2.1 : Load Balancing - Application Servers and Database servers must be load balanced at the application level to ensure maximum stability and availability. Specific scenarios, such as fail-over versus session-managed load balancing need to be addressed in the functional requirements specification.

3.5.2.2 : The system will use, where appropriate, the standard hardware and data communications resources provided by the NutrAssistant center. This includes, but is not limited to, the general Ethernet networkT1 connection at the server/hosting site, network servers, and network management tools.

3.6 Software Requirements

3.6.1 Backup Software : Data and application backups will be managed through fully supported backup software solutions.

3.6.2 : HTTP and Application Server Applications – As the Web will be the primary delivery protocol for the application, HTTP and related Application server applications will be required to support system functionality.

3.6.3 : Web Browsers: In support of External Interface requirements, commonly supported web browsers will be used to implement a thin-client architecture.

3.6.4 : Email Services: for alerts email server applications will be required to support system functionality.

3.6.5 : Relational Database Management System : As the primary data storage mechanism for the corporate standard relational database management system, a RDBMS such as Postgre SQL Server will be required to support system functionality.

4. External Interface Requirements

4.1 User Interfaces

The user interface will be simple and consistent, using terminology commonly understood by the intended users of the system. The system will have a simple interface, consistent with industry standard interfaces, to eliminate the need for user training of infrequent users. The NutrAssistant team will evaluate the user interface of similar systems and apply appropriately. User testing will be used to ensure the user interface is clear (simple, commonly understood vocabulary, intuitive to use without training), complete (users can perform all functions from the interface), and consistent(buttons and wording are the same throughout the system).

4.2 Hardware Interfaces

No extra hardware interfaces are needed. The system will use the standard hardware and data communications resources provided by the NutrAssistant data center. This includes, but is not limited to, the general Ethernet network/T1 connection at the server/hosting site, network servers, and network management tools. This system will include a warning message when a low transmission speed is detected, and a non-graphical interface option will be available.

4.3 Software Interfaces

The system will use the standard software resources available on the Internet and some other resources provided by the NutrAssistant data center. This includes, but is not limited to, Java Scripts, HTML, CSS, Web Frameworks, RDMS Server (MS SQL Server), and Application server (IIS and Node.js) and also if there is another necessary resource needed by the NutrAssistant system this should be included when it is developing.

4.4 Communication Interfaces

The system will use the communications resources provided by the NutrAssistant data center. This includes, but is not limited to HTTP protocol for communication with the web browser and the web server and TCP/IP network protocol with HTTP protocol.

5- Appendix 1 : Domain Knowledge

Macronutrients : Macronutrients are those nutrients that the body needs in large amounts. These provide the body with energy (calories). These are :

- Carbohydrates
- Proteins
- Fats

Micronutrients: Micronutrients are those nutrients that the body needs in smaller amounts. These are :

- Vitamins :
- Water Soluble Vitamins
    - Vitamin B1
    - Vitamin B2
    - Vitamin B6
    - Vitamin B12
    - Vitamin C
    - Folic Acid
- Fat Soluble Vitamins
    - Vitamin A
    - Vitamin D
    - Vitamin E
    - Vitamin K
- Minerals
    - Calcium
    - Potassium
    - Sodium
    - Iron
    - Zinc

- Water

Proteins
Role in the Body

1. Tissue structure (part of organ tissues, muscle, hair, skin, nails, bones, tendons, ligaments and blood plasma)
2. Part of cell plasma membranes
3. Involved in metabolic, transport, and hormone systems
4. Make up enzymes that regulate metabolism
5. Invovled in acid/base balance to maintain a neutral environment in our bodies

Recommended Daily Allowance

1. Sedentary Individuals: 0.36 grams of protein per pound of body weight
2. Recreationally Active: 0.45-0.68 grams of protein per pound of body weight
3. Competitive Athlete: 0.54-0.82 grams of protein per pound of body weight
4. Teenage Athlete: 0.82-0.91 grams of protein per pound of body weight
5. Body Builder: 0.64-0.91 grams of protein per pound of body weight
6. When restricting Calories: 0364-0.91 grams of protein per pound of body weight
7. Maximum amount of protein the body can utilize: 0.91 grams of protein per pound of body weight

NOTE: 1 gram of protein = 4 Calories

Food Sources

1. Legumes (beans)
2. Lentils
3. Soy products, such as tofu
4. Peanuts and nuts
5. Whole grains (quinoa, oats, brown rice)
6. Seeds
7. Meat alternative products
8. Some vegetables
9. Animal sources

Fats
Role in the Body

1. Energy reserve

2. Protects vital organs
3. Insulation
4. Transport fat soluble vitamins

Recommended Allowance

1. 20-35% of your total daily calories should come from fat

   Less than 10% of total daily calories should come from Saturated Fat (coconut and plam kernal oil, shortening, butter, cream cheese, full fat dairy products)

NOTE: 1 gram of fat = 9 Calories

Food Sources

1. Oils
2. Nuts
3. Seeds
4. Meat, fish, dairy
5. Micronutrients

Vitamin B1: Thiamin
Function

1. Needed to release energy in food
2. Prevents beriberi

Food Sources

1. Whole grains
2. Dried beans
3. Peas
4. Peanuts
5. Animal proteins

Vitamin B2: Riboflavin
Function

1. Needed to build and maintain body tissues

Food Sources

1. Whole grains

2. Green and yellow vegetables
3. Animal proteins

Vitamin B6: Pyridoxine
Function
1. Helps the development of the nervous system
2. Involved in the production of blood
3. Helps break down protein and glucose to produce energy for the body

Food Sources
1. Potatoes
2. Chickpeas
3. Yeast
4. Nuts
5. Bulgur
6. Fish
7. Rice
8. Bananas

Vitamin B12: Cobalamine
Function
1. Promotes proper growth and development of the nervous system

Food Sources
1. Fortified cereals
2. Nutritional yeast
3. Algae
4. Animal products

Vitamin C: Ascorbic Acid
Function
1. Helps form growth hormones
2. Needed to build strong gums, teeth, and bones
3. Antioxidant

Food Source
1. Citrus fruits

2. Cabbage
3. Berries
4. Peppers

Folic Acid
Function
1. Helps build DNA and protein
2. Helps maintain intestinal tract
3. Aids in bone growth
4. Prevents nervous system birth defects

Food Sources
1. Dark green leafy vegetables
2. Yeast
3. Wheat germ

Vitamin A: Retinal
Function
1. Vision
2. Healthy skin
3. Healthy hair

Food Sources
1. Animal products
2. Body can make vitamin A from vegetables that have carotene
    1. Carrots
    2. Sweet potatoes
    3. Other red-orange vegetables

Vitamin D
Function
1. Promotes strong teeth and bones
2. Prevents rickets

Food Sources
1. Mushrooms
2. Dairy Milk & Fortified Non-Dairy Milk

3. Fortified cereals
4. Cod liver oil
5. Tuna
6. Salmon
7. Egg yolks
8. Produced by the body when exposed to sunlight

Vitamin E
Function

1. Prevents damage to cell membranes
2. Protects vitamin A
3. Aids in blood production

Food Sources

1. Seeds and Nuts
2. Vegetable oil

Vitamin K
Function

1. Aids in blood clotting

Food Sources

1. Green leafy vegetables
2. Produced by bacteria in the large intestine

Calcium
Function

1. Maintains teeth and bones
2. Helps blood clot
3. Helps nerves and muscles function

Food Sources

1. Dairy Milk & Fortified Non-Dairy Milks
2. Dark green vegetables
3. Sardines
4. Clams
5. Oysters

6. Legumes
7. Almonds

Potassium
Function

1. Regulates water balance in cells
2. Helps nerves function
3. Important for heart rhythm

Food Sources

1. Oranges
2. Bananas
3. Cereal
4. Potatoes
5. Dried beans

Sodium
Function

1. Regulates water balance
2. Stimulates nerves

Food Sources

1. Table salt
2. Bread
3. Almost everything

Iron
Function

1. Forms blood cells
2. Transports oxygen throughout the body

Food SourceS

1. Dark green vegetables
2. Whole-grain cereals
3. Whole grains, such as brown rice & quinoa
4. Legumes
5. Lentils

6. Nuts
7. Seeds
8. Dried fruits
9. Animal proteins

Zinc
Function
1. Aids in transport of carbon dioxide
2. Aids in healing wounds
3. Forms enzymes

Food Sources
1. Whole grains
2. Dairy Milk & Fortified Non-Dairy Milks
3. Legumes

Water
Functions
1. Moistens tissues such as those in the mouth, eyes, and nose
2. Protects body organs and tissues
3. Helps prevent constipation
4. Helps dissolve minerals and other nutrients to make them accessible to the body
5. Regulates body temperature
6. Lubricates joints
7. Lessens the burden on the kidneys and liver by flushing out waste products
8. Carries nutrients and oxygen to cells