



**Science Behind the Story (SBS)**  
**Eat Right – What Does That Mean? (🌈 A Physical Health Story)**  
**(5<sup>th</sup> Grade – 10-11 yrs)**

This story tries to make sense of what we know (and what we are still learning) about eating to stay healthy.

🌈 All animals need to eat to get energy and nutrients that our body and brain needs to survive.

We eat so that we can get food that we need for energy and also nutrients that our body needs for growth, maintenance, and repair of body structures. Our digestive systems break down the food we eat into simpler substances that our bodies can use (Boland, 2016). Glucose, fatty acids and ketones are all sources of energy for the cells in our body (Tirone, 2001). Our brain can only use glucose (McCall, 2004). The nutritional requirements of our bodies consist of at least 20 amino acids (9 of which we don't make and we have to get through our diet – these are essential amino acids) and about 15 vitamins (including the B complex) and a number of minerals (Breedlove, 2020). We are still not sure exactly what the nutritional requirements are the humans. These nutritional requirements also change throughout life. For example, the amount of calcium needed from birth through adolescence increases from 200-1300 mg/day ([www.bones.nih.gov](http://www.bones.nih.gov)).

🌈 There are so many ideas about **what** we should be eating to keep our body and our brains healthy. The more that we learn about our bodies and our brains, the more we understand the kinds of foods that we should be eating. (note-this information changes as science gives us more info)


Our current understanding of what we should eat is based on the how much energy and the types of nutrients (proteins, vitamins and minerals) that are brain and bodies need to stay healthy. Since everyone's brain and body are different, it makes sense that there is "no one size fits all" for what and how much we should be eating. Plus, as our understanding of how the brain and body works continues to grow, so does our understanding of how and what we should be eating.

Luckily, there are some commonalities in the about what and how we should be eating. We know that 30% of your daily energy requirements are needed just to maintain your brain (Tomasi, 2013). The more you use your brain and your body, the more energy is needed, so the more food you have to eat. In a perfect world, we would all listen to the signals that our body sends to our brain about our energy needs and to eat the amount of food that would give us that amount of energy. Listening to our body signals should be easy, when you are hungry that means you need food to give you the energy you need to do whatever behavior you are doing (Weltens, 2018). Learning how to eat slowly allows your body to send signals to your brain, so you will know when you are no longer hungry and you can stop eating.

When considering the nutrients that are necessary in our diet, there are also a number of things we know about what we need for the health of our body and brain. We know that you need protein in your diet to help your body repair cells and make new ones. Every single cell in your body and your brain is made up of proteins ([www.sciencedaily.com](http://www.sciencedaily.com)). Proteins are made of amino acids ([www.eufic.org](http://www.eufic.org)). Our body needs 20 different amino acids and there are 9 amino acids that our body cannot make itself (known as essential

amino acids), so we need get those amino acids in the proteins that we eat ([www.eufic.org](http://www.eufic.org)). Foods like meat, eggs, quinoa and soy (beans) contain all of the essential amino acids ([www.eufic.org](http://www.eufic.org)).

You also need vitamins and minerals because they work together to keep your bones strong, to help your body to take care of itself and fix things when they are damaged. There are currently about 6 vitamins (which includes multiple B complex vitamins) and about 15 minerals that we need to keep our body and brain healthy ([www.nccih.nih.gov](http://www.nccih.nih.gov)). Some research points to cravings as the body's way to maintain nutrient balance by sending signals to our brain about our nutritional needs, however this is a topic that is debated (Meule, 2020).

 There are no good or bad foods, there are just foods that give us what we need and other foods that do not. Taste and society play a big role in what, and even how, we eat.

Guided by science, the US Department of Agriculture is currently recommending the MyPlate way of eating ([www.myplate.gov](http://www.myplate.gov)). The current understanding is that in order to keep your body and your brain healthy you should eat from the 5 food groups every day ([www.myplate.gov](http://www.myplate.gov)). Below are just some examples of foods in these food groups.

Fruits – apple, bananas, berries, grapes, kiwi, orange, peach, pineapple  
Vegetables – broccoli, carrots, green beans, lettuce, peas, potatoes, sweet potatoes  
Proteins – poultry, nuts, fish, pork, eggs, beans, tofu, peanut butter  
Grains – bread, bagel, cereal, pasta, oats, tortilla, grains, barley, rice, crackers  
Dairy – cheese, yogurt, milk and milk products (ice cream)

Using a “plate” as a guide,  $\frac{1}{2}$  of what you eat each day should be fruits and vegetables,  $\frac{1}{4}$  of what you eat each day should be grains,  $\frac{1}{4}$  of what you eat each day should be proteins and you should have a serving of dairy each day.

The whole idea of “myplate” is that all foods give us energy, but we should be reserving the space on our “plates” and in our stomachs for more nutrient rich foods. In that way, we are getting both the energy and the nutrients that we need without filling up on just energy rich foods. If you eat only energy rich foods, you will be happy and your reward pathway will be activated, but this decreases our eating of the nutrient rich foods that we need (Meule, 2020). Plus, because energy rich foods contain more energy than we need, our bodies will have to store that energy. This means that we are storing energy in fat cells, which can have a number of deleterious consequences (Bray, 2017). People who are making and advertising energy rich foods are making money when we eat them, so they want us to eat them over eating more nutrient rich foods (Bublitz, 2010).

So, while there are not good and bad foods, you need to make sure that you are eating nutrient rich foods as the main part of your diet ([www.myplate.gov](http://www.myplate.gov)). You can eat other foods that primarily contain energy, but these should be eaten in moderation (Rollins, 2015). Remember, your brain – while it can “tell” you what you need in terms of energy and nutrients – it likes to be happy. Yummy foods make your brain happy, so this is a time when you need to be helping your brain to help you eat right and stay healthy.

## **National Standards:**

### **Next Generation Science Standards**

- Crosscutting Concepts
  - **Energy & Matter:** Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior.
  - **Structures & Functions:** The way an object is shaped or structured determines many of its properties and functions.
    - The shape and stability of structures of natural and designed objects are related to their function(s).

- **Cause & Effect:** Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.
  - Events have causes that generate observable patterns.
- Related Grade Level Content
  - Matter & Energy In Organisms & Ecosystems

### **National Health Education Standards (Shape America) & CDC (Centers for Disease Control and Prevention)**

- **Standard 1:** Students will comprehend concepts related to health promotion and disease prevention to enhance health.
  - 1.5.1: Describe the relationship between healthy behaviors and personal health. **(CDC)**
  - 1.5.2: Identify examples of emotional, intellectual, physical, and social health. **(CDC)**
- **Standard 2:** Students will analyze the influence of family, peers, culture, media, technology, and other factors on health behaviors.
  - 2.5.2: Identify the influence of culture on health practices and behaviors. **(CDC)**
  - 2.5.5: Explain how media influences thoughts, feelings, and health behaviors. **(CDC)**
- **Standard 3:** Students will demonstrate the ability to access valid information, products, and services to enhance health.
  - 3.5.1: Identify characteristics of valid health information, products, and services. **(CDC)**
- **Standard 5:** Students will demonstrate the ability to use decision-making skills to enhance health.
  - 5.5.1: Identify health-related situations that might require a thoughtful decision. **(CDC)**
  - 5.5.3: List healthy options to health-related issues or problems. **(CDC)**
  - 5.5.5: Choose a healthy option when making a decision. **(CDC)**
  - 5.5.6: Describe the outcomes of a health-related decision. **(CDC)**
- **Standard 7:** Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.
  - 7.5.1: Identify responsible personal health behaviors. **(CDC)**
  - 7.5.2: Demonstrate a variety of healthy practices and behaviors to maintain or improve personal health. **(CDC)**
  - 7.5.3: Demonstrate a variety of behaviors to avoid or reduce health risks. **(CDC)**
- **Standard 8:** Students will demonstrate the ability to advocate for personal, family, and community health.
  - 8.5.1: Express opinions and give accurate information about health issues. **(CDC)**
  - 8.5.2: Encourage others to make positive health choices. **(CDC)**

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