



---

# Sports Nutrition Manual for High School Athletes

*Washington State Athletic Association*

DEVELOPED BY

Kadi Grieve (MS) and Kelly Pritchett PhD,  
RD, CSSD, Central Washington University



Developed in partnership with  
the Washington State Dairy Council

**[WADAIRY.ORG/NUTRITION](http://WADAIRY.ORG/NUTRITION)**

## **MACRONUTRIENTS**

<i>Carbohydrates</i>	<b>4,5</b>
<i>Protein</i>	<b>6,7</b>
<i>Fat</i>	<b>8</b>

## **MICRONUTRIENTS OF CONCERN**

<i>Iron</i>	<b>9</b>
<i>Calcium</i>	<b>10</b>
<i>Vitamin D</i>	<b>11</b>

## **EXAMPLE TRAINING PLATES**

<i>Meals at different intensities (high, moderate, low/rest)</i>	<b>12</b>
--	-----------

## **HYDRATION** **13,14**

## **FUEL FOR EXERCISE**

<i>Pre-exercise fueling</i>	<b>15</b>
<i>Fuel during exercise</i>	<b>16</b>
<i>Fuel for recovery</i>	<b>17</b>

## **NAVIGATING SUPPLEMENTS** **18**

## **NUTRITION FOR THE INJURED ATHLETE** **19**

<b>RELATIVE ENERGY DEFICIENCY IN SPORTS (RED-S) AND THE DANGERS OF WEIGHT LOSS</b>	<b>20,21</b>
<b>SIMPLE MEALS TO MAKE AT HOME</b>	<b>22-24</b>
<b>SNACKS ON THE GO</b>	<b>25</b>
<b>NAVIGATING THE SCHOOL CAFETERIA</b>	<b>26</b>
<b>EATING HEALTHY ON THE GO</b>	<b>27</b>
<b>GROCERY SHOPPING</b>	<b>28,29</b>
<b>TAKE HOME TIPS AND SUMMARY</b>	<b>30,31</b>

# Carbohydrates: Fuel Your Workout



## What are carbs?

Carbs are the primary source of fuel for the brain and body and are stored in our muscles as glycogen so we can quickly use them when we need energy. When glycogen stores are low, energy levels, strength, and decision-making may suffer.

## Fueling before and during exercise: is it important?

- Tops off glycogen stores and delays fatigue
- Provides fuel when carb/glycogen stores are low/depleted
- Decreases perceived exertion (how hard the exercise feels)

## Carb Sources



Juice  
Granola Bar  
Beans/lentils  
Tortilla  
Bagel



Quinoa  
Bread  
Crackers  
Potatoes  
Starchy Vegetables  
Sports Drinks



Fruit  
Milk  
Yogurt  
Rice  
Oatmeal



## How Much?

Athletes should consume 3-12 g of carbs per kg of body weight daily.  
How do I convert pounds to kilograms? Easy! Divide pounds by 2.2.

*Example: 150 lb / 2.2 = 68 kg*

$$68 \times 3 = 204$$

$$69 \times 12 = 816$$

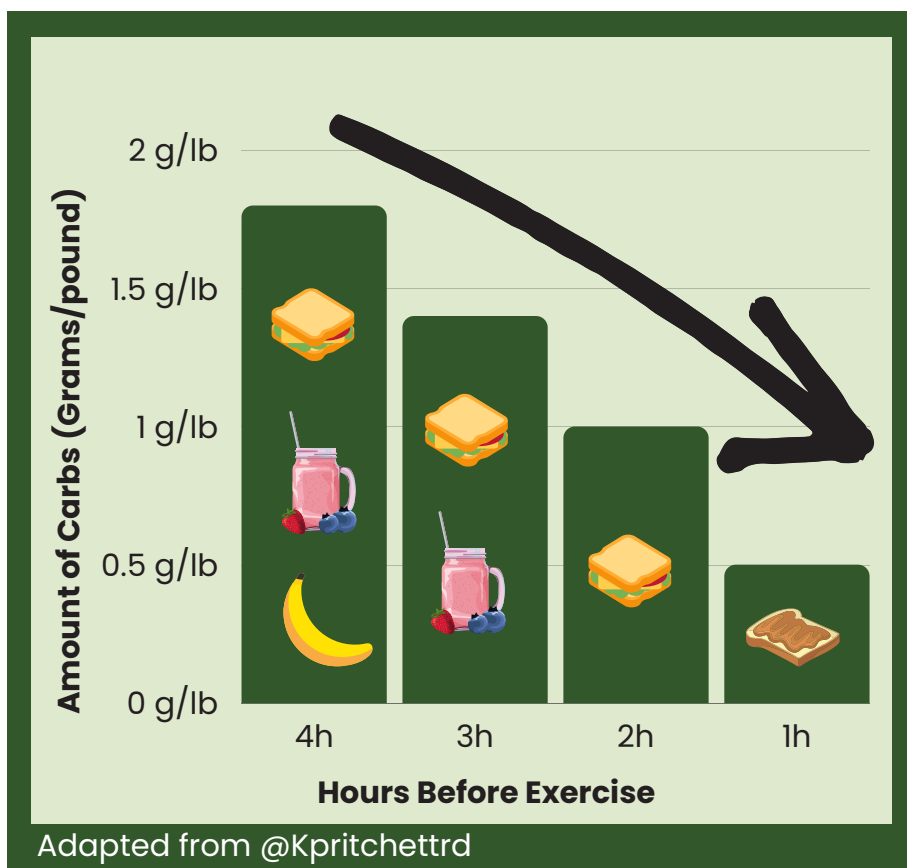
*150lb athlete would need ~200-800 g of carbs a day.*

# Carb Timing

## Before an Event



Pre-exercise meals or snacks should be primarily carbs with some protein. Limit fat and fiber as these slow digestion.



## Early Morning Workout?

Focus on a high-carb dinner the night before and have a small carbohydrate snack ~ 45-60 minutes before exercise.

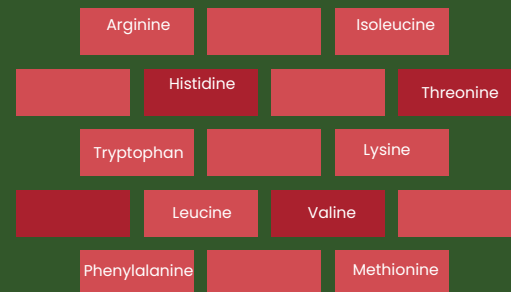






# Complete vs. Incomplete Protein: What is it?

If protein is a brick wall, then amino acids are the individual bricks. There are 20 different amino acids, but 9 are essential to get from food. These are known as “essential amino acids”.



Complete proteins: Foods containing all 9 amino acids

Sources: meat, eggs, dairy products, tofu, tempeh, and edamame.

Foods that do not contain all 9 amino acids are known as “incomplete proteins”. Therefore, it is important to eat a variety of protein sources to ensure you are getting all 9 essential amino acids!



Plant-based protein sources tend to be incomplete proteins, so if you limit meat consumption, try combining different sources of protein to make sure you get all amino acids!



# Dietary Fat: Saturated and Unsaturated

## Functions in the body

- Provides structure to cells
- Maintain body temperature
- Cushions organs
- Needed for absorption of fat-soluble vitamins
- Improves taste and texture of food
- Increases energy density of food and diet

**Saturated fats** – solid at room temperature. Increased consumption is associated with adverse health effects, such as elevated cholesterol, increased risk for heart disease/stroke, and inflammation



**Sources:** fried food, full-fat dairy products, fatty cuts of meat, chicken skin, coconut oil, and commercially produced baked products.



**Unsaturated fats** – liquid at room temperature and lower the risk of heart disease, stroke, and inflammation.



***These are the fats you should try to get in your diet!***



Sources include nuts, seeds, fatty fish, oils (olive, canola, peanut), avocados, and eggs.



Athletes should consume 1-2g of fat per kg body weight.

Example: a 150lb athlete, should aim for consuming ~70-140 grams of fat per day



# Micronutrients of Concern: Iron



*"Supplements do not enhance performance, but deficiencies do impede performance."*



## Iron



Iron is the component of blood that carries oxygen to the tissues. Oxygen is needed for energy metabolism, so an iron deficiency may result in fatigue, reduced work capacity, diminished training and performance outcomes, and reduced recovery.

## Types of Iron

**Non-heme iron** - comes from plant sources, such as fortified breakfast cereals, beans, lentils, nuts or seeds, spinach, and potato skin.

**Heme iron** - comes from animal sources and is easier for our body to break down than non-heme iron. Sources of heme iron include chicken, beef, pork, or fish.

## How Much?

### **Female athletes (age 14-18)**

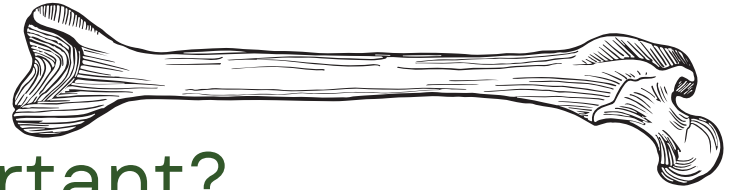
have a higher risk of iron deficiency due to iron losses during menstruation and need 15 mg daily.

**Males (age 14-19)** need 11 mg daily.

Some athletes may consider supplementation **if they are deficient** but should work with a doctor or other certified professional to monitor iron levels. Iron supplementation may cause GI (stomach) distress and some athletes find it beneficial to supplement every other day rather than every day.

# Micronutrients of Concern: Calcium

*90% of peak bone mass is achieved by the age of 18! This means low calcium intake will impact lifelong bone health*



## Why is Calcium Important?

Develops strong bones  
Facilitates heart and muscle contraction  
Aids in blood clotting and nerve transmission



## Did You Know?

Most of our body's calcium is stored in the bone and only a small amount in the blood. If blood calcium levels get too low, however, the body actually breaks down bone to get more. This is why it is important to consume enough calcium from the diet!



## How Much Calcium Do I Need?

Individuals aged 9–18 need 1300 mg of calcium daily. That's a little more than 4 glasses of milk! Other sources include:

Calcium-fortified orange juice

Edamame

Almonds

Leafy Greens

Plant-based milk

Cheese

Yogurt

Tofu

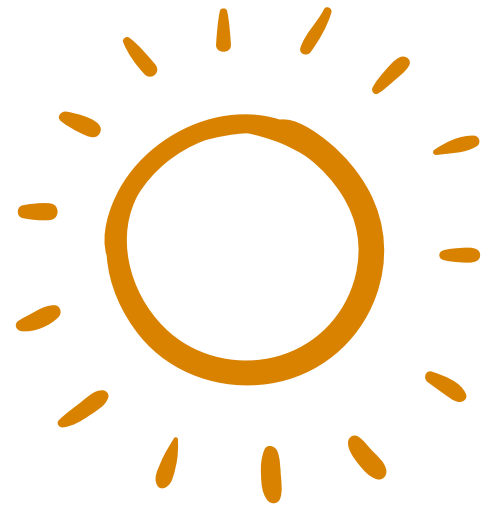


# Vitamins of Concern: Vitamin D

## *The Sunshine Vitamin*

### What Does It Do?

- Aids in calcium absorption
- Facilitates muscle contraction and nerve transmission
- Supports immune function



### How Much Do I Need?

People aged 1-70 need 15 mcg, or 600 IU (international units) per day. This is equivalent to sitting outside for 10-30 minutes, depending on skin tone and time of day.

### Can I only get vitamin D through the sun?



Nope! Even though the best source of vitamin D is sun exposure, vitamin D can be found in smaller amounts through food.



Sources include:

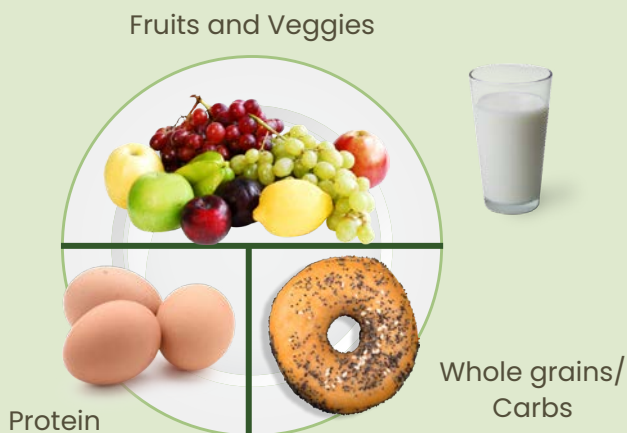
- Fortified regular and plant-based milk
- Fortified breakfast cereal
- Fatty fish (salmon, trout, tuna) and fish liver oil
- Sun exposed mushrooms



# Example Athlete Training Plates

*Aim to make your meals look similar to these plates!*

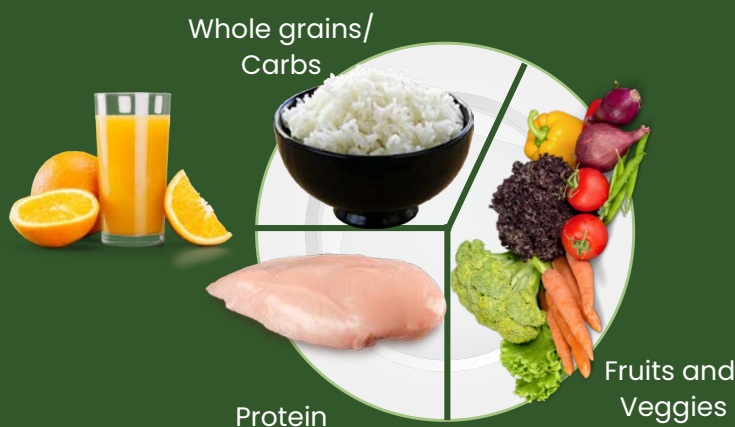
## Easy Training/Rest Day



On easy training or rest days, it's normal to feel hungrier than even high-intensity training! Your body is trying to **replenish** its glycogen stores and **rebuild** muscle - and it needs fuel to do it!

Nutrition is **individualized**. Your nutrition needs will look different than your teammates' - and that's ok!

## Moderate Training Day



## High-intensity Training



This is just a visual guide to help point you in the right direction. Your body knows what it needs, so it is important to listen to your hunger cues and eat when hungry!



# Hydration



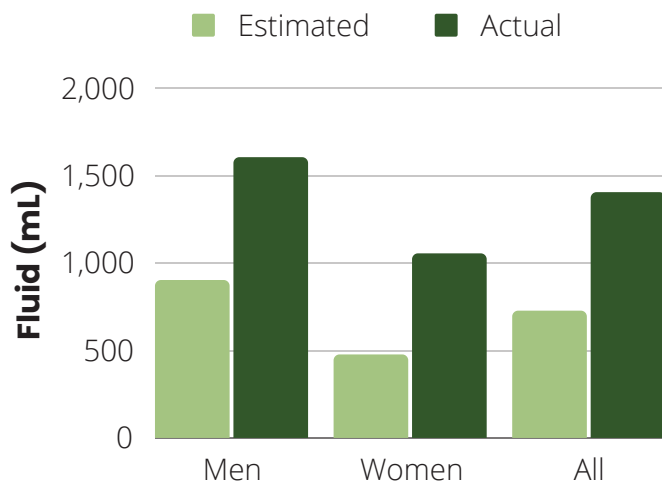
## Signs of Dehydration

Headaches  
Muscle Cramps  
Dry Mouth  
Dizziness or Fainting  
Dry Skin  
Fatigue  
Dark Urine  
Infrequent Urination

## Did you know?

Most athletes significantly underestimate fluid losses during exercise. In the graph below, the light bar is how much fluid athletes *thought* they lost, and the dark bar is how much they actually lost!

Sweat loss estimation vs. actual sweat loss



Adapted from Eric O' Neal et al 2014

## Tips for Staying Hydrated

### Before

Drink 2–3 cups of water 2.5 hours before exercise to begin exercise hydrated.

### During

Drink 4–8 oz of fluid every 20 minutes. Hydration is most important when exercising in the heat or for long periods/at high intensities.

### After

Drink 20–24 oz of water per pound lost within 2 hours post-exercise.



# Hydration

## How do I figure out my exact fluid needs?

Weigh-in before and after exercise in the nude in kilograms, not pounds. Don't drink or use the restroom after your first weigh-in, this will skew the results!

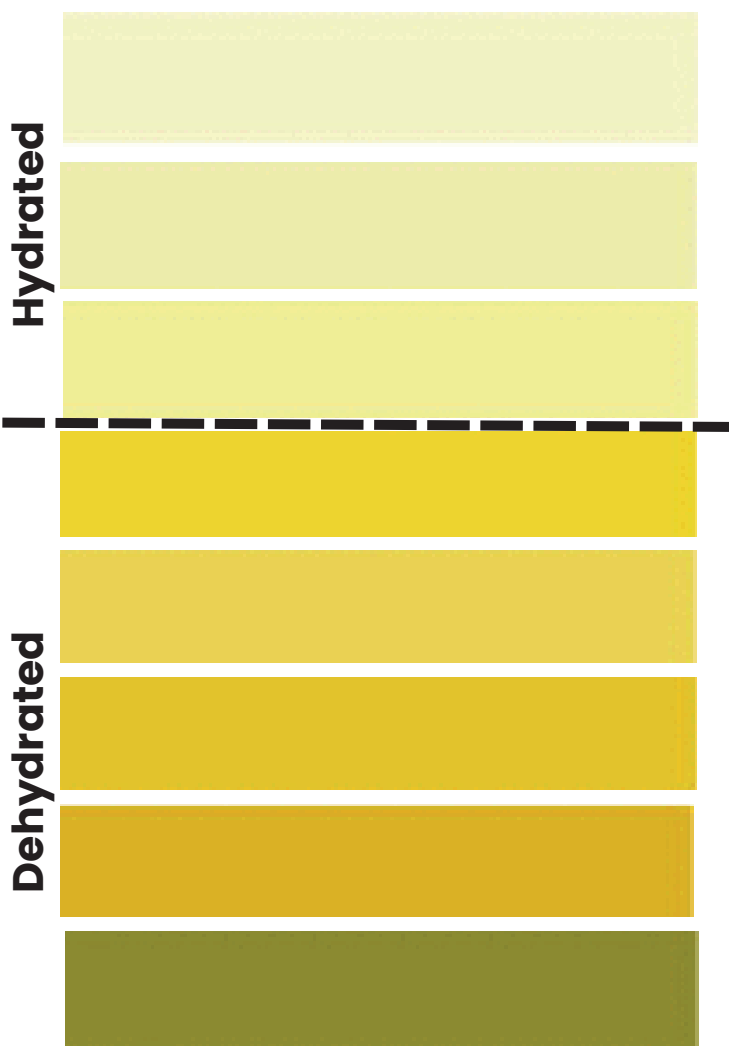


## How much weight did you lose?

1 kg lost = 1 liter lost through sweat.

1 L of water is about 33 ounces (2 x 16 oz water bottles)

Urine color can be a great way to tell if you're hydrated enough! If your urine is above the line, then you are adequately hydrated. If you are below the line, then you are dehydrated.



### Pro Tip:

If you struggle to drink enough throughout the day, try carrying a water bottle with you to class. Need extra help? Try using a straw or adding some fresh fruit to add some flavor!

# Pre-Exercise Fueling

Fueling before exercise provides your body with much-needed fuel so you can perform your best!



## Benefits of pre-exercise fueling:

- Improved performance
- Improved decision making
- Provides energy for the mind and muscles
- Prevents hunger
- Spares muscle protein breakdown
- Delays fatigue



Meals should be primarily carbohydrates. Remember, carbs are the primary source of fuel for the muscles.

The closer the meal/snack is to your event, the lower in fat, protein, and fiber it should be to make the food easier to digest.

## What?

**4 hours before** – Fruit smoothie, peanut butter banana sandwich, greek yogurt and granola

**2 hours before** – Instant oatmeal with a handful of berries and a glass of milk

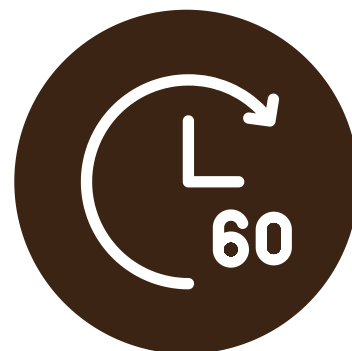
**0.5 hours before** – stick to liquid carbs (sports drink or juice) or a high-carb sports bar

Stick to foods that are familiar! Remember, to avoid trying new foods on a competition day.

# Fueling During Exercise

## Exercise lasting less than an hour

Carbs are not necessary for exercise under an hour, assuming you fueled well before! However, swishing a sports drink in your mouth for 5-10 seconds (and then spitting) may improve performance. This may also be useful for athletes who experience stomach discomfort when eating during exercise.



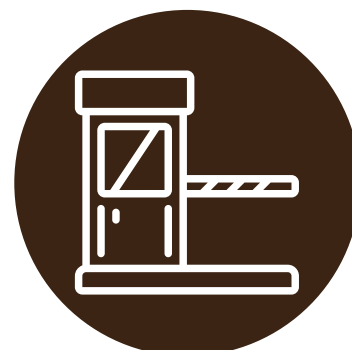
## Exercise lasting 1-2.5 hours

Consume 30-60 grams of carbohydrates per hour. Practice fueling techniques during training to see what best works for you on race day!



## Exercise lasting > 2.5 hours

Consume 90 grams of carbs per hour. When eating more than 60 grams of carbs, consume more than one carb source. Think of carbs being absorbed like cars going through a toll booth. The toll booths get maxed out when you only eat one source of carbs, but by combining different carb sources, you can absorb more carbs and avoid stomach distress. Look for sports drinks that have both glucose and fructose!



# Fueling After Exercise

To promote growth and recovery

## Why eat after exercise?

Fueling after exercise:

- Replenishes depleted glycogen (aka energy) stores
- Improves recovery
- Refuels for your next workout

## Example

### Recovery Meals

- Chocolate milk
- Banana and peanut butter
- Protein shake
- Whole fruit or fruit juice
- Sports bar or drink
- Fruit smoothie
- Greek yogurt

## When?

Immediately after exercise consume a snack, and then a meal around 2 hours later.

## What?

Post-exercise snack/meal should contain these three components:

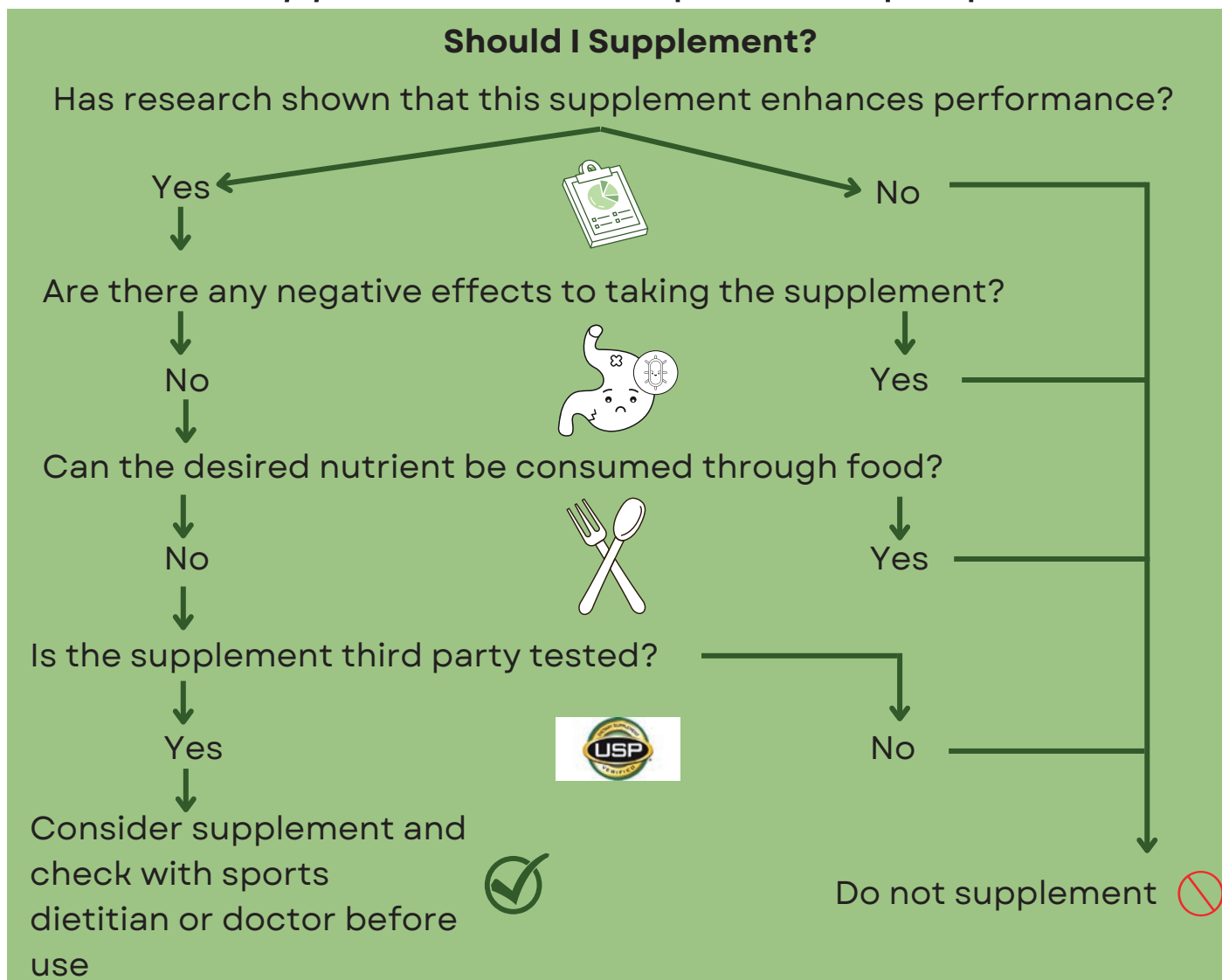
- **Carbs** to replenish glycogen stores
- **Protein** to stimulate muscle growth and recovery
- **Fluids** to rehydrate





# Navigating Supplements

When considering supplementation, remember that **food should come first**. Supplements, if used, should *supplement* (not replace!) a proper diet.



## Supplements- What To Know:

Did you know that supplements are **not regulated** by the FDA? This means there is no guarantee about safety, efficacy, or purity. This means certain supplements may also contain substances banned for sports.

Look for these labels when buying supplements:

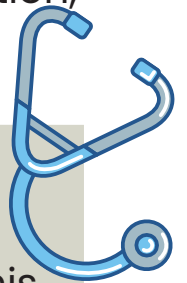


---

# Nutrition for the Injured Athlete

---

Nutrition plays an important role in injury recovery and rehabilitation. With proper nutrition, athletes may reduce surgical complications, minimize muscle loss during immobilization, maximize return to play, and optimize recovery.



## Energy

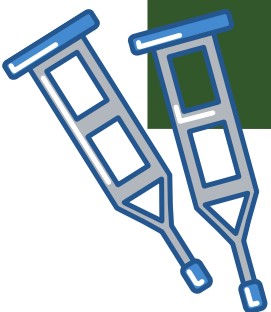
Energy needs are increased during times of injury and recovery to support the growth of new cells and tissue. This can range anywhere from 20% to 100% additional calories per day, depending on the severity of the injury.

## Protein

Protein needs are also significantly higher during recovery and rehabilitation. Consume 2 grams of protein/kg/day to support growth and recovery and prevent the loss of lean body mass.

## Omega 3 Fats

Omega 3 fats are essential for wound healing and increasing cell generation. Adding fat to your diet is a great way to increase energy consumption.



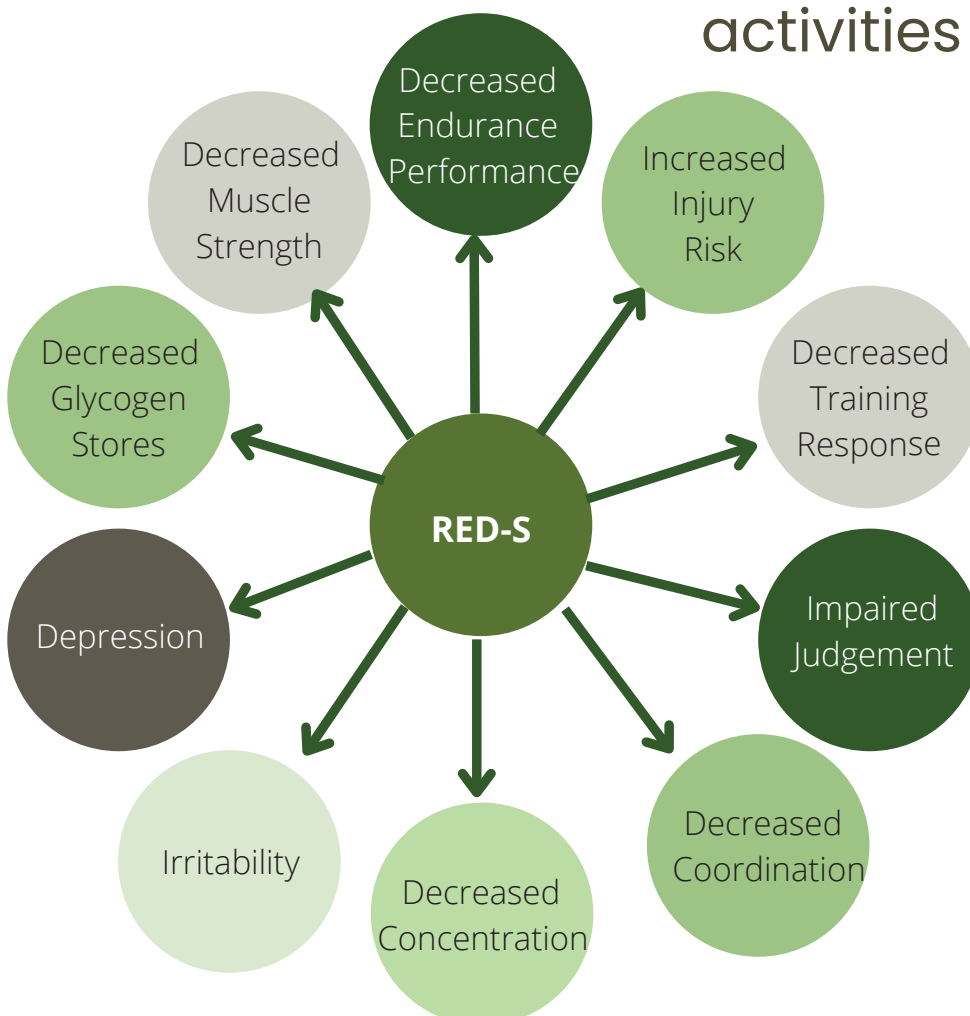
# Relative Energy Deficiency in Sports (RED-S)

## What is Energy Availability?

Energy Availability = Calorie Intake - Calories Burned

## What is RED-S?

RED-S is a condition where athletes do not consume enough calories to support their normal activities and physiological functions.



## What are the consequences of low energy?

- Impaired performance
- Compromised growth and development
- Damage to bones

# Dangers of Weight Loss

---

1

Athletes should **not** try to lose weight during their season. Doing so may result in poor performance, poor decision-making, depression, anxiety, and potentially even lifelong health consequences such as osteoporosis.

2

When not enough energy is available, our body breaks down protein (muscles). Because of this, protein should be increased to 2 grams of protein per kg per day to preserve muscle mass **if** weight loss is attempted. If low energy availability is not intentional, increasing fat intake can help increase the energy content of food.

3

It is not normal or healthy to miss periods. Missed periods after the age of 16 means you are not eating enough to support your body. Be aware that taking birth control pills can mask the problem of low energy availability.

---

If you or a teammate are struggling with disordered eating, visit the National Eating Disorders Association at <https://www.nationaleatingdisorders.org> to get support.

# Simple Breakfast Ideas to Make at Home

45% of high school athletes report skipping breakfast! Breakfast is associated with increased energy, concentration, and better grades.

## Easy Overnight Oats

Make the night before and enjoy on your way to school!

### Instructions

1. Combine ingredients and stir
2. Store oat mixture in air-tight container and refrigerate overnight
3. Top with fresh fruit, chopped nuts, nut butter, or any desired toppings, and enjoy!

### Ingredients

- 1/2 cup old fashioned oats
- 1/2 cup milk of choice
- 1/2 teaspoon maple syrup
- 1/2 teaspoon pure vanilla extract



## Egg Scramble

For mornings when you have a bit more time! Serve with whole-grain toast or English muffin and side of fresh fruit!



### Ingredients

- 2 eggs
- 1/4 cup chopped veggies of choice
- Salt and pepper to taste
- Whole grain bread
- Optional side of fruit

### Instructions

1. Heat oil on a skillet on medium heat
2. Add veggies and sauté until soft (~4-6 minutes)
3. Whisk eggs in a bowl and add salt and pepper
4. Once veggies are cooked, add eggs and stir every few seconds until no liquid remains
5. Serve and enjoy!



# Simple Lunches to Make at Home

## Banana PB&J

A simple twist on an old classic! Pair with some sides like baby carrots and hummus

### Instructions

1. Spread peanut or nut butter evenly over both slices of bread
2. Place sliced banana on bread and combine

### Ingredients

- 2 slices whole-grain bread
- 2 tbs peanut or nut butter
- 1 Banana, sliced



## Turkey and Cheddar Sandwich

Hearty and filling!



### Instructions

1. Spread mayo and mustard evenly over bread
2. Top with turkey, cheddar, and lettuce
3. Combine and enjoy with your favorite sides (try apple slices and pretzels)

### Ingredients

- 2 slices whole-grain bread
- 2-4 slices of sliced turkey
- Sliced cheddar cheese
- 2-3 slices of Roma tomatoes
- 1 tbs mayo
- 1 tbs mustard

# Simple Dinners to Make at Home

## Sweet Potato Black Bean Tacos

Perfect for an easy weekday dinner!

### Instructions -

1. Preheat oven to 400 degrees
2. Add sweet potato, oil, and seasonings to pan and mix
3. Bake 30-40 minutes
4. Add black beans to pan and bake for 5 min.
5. Heat tortillas in microwave, top with avocado and potato-bean mixture.
6. Serve and enjoy!

### Ingredients -

- 1 tbs olive oil
- 1 sweet potato, thinly cubed
- 1 can black beans
- Taco seasoning of choice
- Corn tortillas
- Avocado
- Lime wedge



## Veggie Stir-Fry

Delicious and veggie-packed!

### Ingredients

- 1 cup sliced veggies of choice (onion, bell pepper, broccoli)
- Whole grain rice
- Oil (olive or sesame)
- Soy or teriyaki sauce
- Pre-cooked chicken or tofu

### Instructions

1. Cook rice according to package directions
2. Heat oil on medium heat then add chicken or tofu, cooking for 7-9 minutes
3. Add veggies and continue to cook until soft
4. Serve over rice with soy or teriyaki sauce

# Snacks on the Go



Keeping snacks on hand is a great way to stay fueled and full all day!



## Veggies and hummus

Pair your favorite veggies with hummus for a nutrient and protein-packed snack! Have some extra time? You can even make your own hummus at home!

## Greek yogurt and granola

Greek yogurt is full of protein and granola provides a satisfying crunch! Top with berries, honey, seeds, or any other favorite toppings!



## Trail mix

Packed with nuts and seeds to keep you full, trail mix is a great way to stay fueled throughout the day.

## Fruit with peanut or nut butter

Peanut butter is hearty and filling and pairs well with a lot of different foods! Apples, bananas, and even pretzels are great things to snack on.



---

# Navigating the School Cafeteria

Tips for eating healthy during school breakfast or lunch

## 1. Make your plate colorful!

Different colors of fruits and veggies generally mean they contain different vitamins. Eating the rainbow (hint: not skittles) is a great way to ensure you're getting a variety of nutrients!



## 2. Plan ahead

If there are some school lunches you do and don't like, take a look at the school lunch menu schedule to plan which days you should pack lunch.



## 3. Bring a friend

If you find the lunch line intimidating, try bringing a friend to go through it together!



School lunches are designed to be well-balanced, so eating a school lunch may take away some of the pressure of planning a well-balanced lunch on your own!



# Eating Healthy with Fast Food

Is it possible?



## Choose smaller portions

Instead of going for a hamburger with two or three patties, try switching to a grilled chicken burger instead, or even a burger with one patty. Instead of ordering a large fry, try ordering a small or medium instead.



## Swap the fries

Instead of fries, try ordering a side salad, a side of fruit, or baked potato.



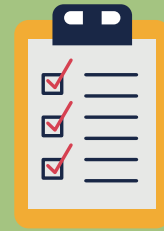
## Opt out of fountain drinks

Instead of a fountain drink, try water, sparkling water, or iced tea. If you can't go without, try going for a smaller size. Instead of a large, get a medium or a small!



# Grocery Shopping

Always go with a list



Plan out a weekly menu or meals you'd like to try

Don't go when you're hungry



Look for items with the fewest ingredients



# Grocery Shopping Made Easy

## Veggies

- Asparagus
- Avocado
- Bell pepper
- Brussel Sprouts
- Broccoli
- Cauliflower
- Carrots
- Celery
- Mushroom
- Onion
- Spinach
- Tomato
- Zucchini



## Protein

- Beef
- Chicken
- Fish
- Poultry
- Cheese/yogurt
- Eggs
- Nuts
- Protein Bars
- Beans (Black, Kidney, garbanzo, etc.)
- Tofu
- Tempeh
- Milk



## Fruits

- Apple
- Banana
- Blackberries
- Blueberries
- Grapes
- Kiwi
- Cherries
- Pineapple
- Orange
- Coconut
- Papaya
- Raspberries

## Fun Foods

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

## Grains

- Bagels
- Barley
- Buckwheat
- Bulger
- Bread
- Crackers
- Oatmeal
- Pasta
- Popcorn
- Rice
- Tortillas
- Quinoa
- Sports bars



# Take-Home Tips for Athletes

Nutrition is essential for athletic performance. If you aren't fueling your best, you aren't going to play your best!

## Carbohydrates

- Carbs are the primary source of fuel during exercise, so it is important you are eating enough.
- Consume 3-12 grams of carbohydrates per kg per day.
- Easily digestible carbs before and during exercise >60 minutes improve performance.
- Carbs after exercise replenish glycogen stores and improve recovery



## Protein

- Consume 1.2-2 grams of protein per kg per day
- Protein timing is just as important as total daily protein! Spread protein intake evenly throughout the day (about 15-25 gram snacks or meals)



## Fat

- Consume 1-2 grams of fat per kg per day
- Unsaturated fats promote health and are the type of fat you should get the most of!
- Fat increases the flavor and energy content of food



---

# Take-Home Tips and Summary

---



## Iron

Iron is the component of blood that carries oxygen to the tissues. Female athletes aged 14-18 need 15 mg daily and males aged 14-19 need 11 mg daily.



## Calcium

Calcium is needed for bone development. If blood calcium is too low, your body breaks down bones to get more. Individuals aged 9-18 need 1300 mg of calcium daily.



## Vitamin D

Aids in calcium absorption, facilitates muscle contraction and nerve transmission, and supports immune function  
People aged 1-70 need 15 mcg, or 600 IU (international units) per day



## Hydration

Drink 2-3 cups of water 2.5 hours before exercise to begin exercise hydrated. Drink 4-8 oz of fluid every 20 minutes during exercise. Drink 20-24 oz of water per pound lost within 2 hours post-exercise.



## Meal Timing

Pre-exercise meals or snacks should be primarily carbs. During exercise longer than 60 minutes, consume 30-60 grams of carbs per hour. After exercise, consume a high-carb snack with some protein to replenish glycogen stores and improve recovery.







Sports Nutrition Manual provided by the Dairy Farmers of Washington, a proud sponsor of WIAA since 1996.

[WADAIRY.ORG](http://WADAIRY.ORG)