



Sports Nutrition Educational Handouts

Dr. Kris Clark
Director of Sports Nutrition, Pennsylvania State University

KLC5@psu.edu
814.863.8107

Fast Nutrition Facts

- **Training doesn't stop on the field or in the weight room**
 - Smart Food Choice is just as important during your training/practice days as it is before a game. You must always be conscious that you are “training” your body with the correct food choices.
 - **Benefits of Daily Good Nutrition:**
 - Decreased time of recovery
 - Increased energy
 - Decreased loss of muscle tissue in-season
 - Increased stamina
 - Decreased body fat percentage
 - Injury prevention
 - Improved health
- **Eat CARBS before a workout to increase your energy levels!!**
 - Toast with jelly
 - Gatorade or juice
 - High carbohydrate energy bar
 - Fruit
 - Cereal
- **Protein + CARBS = RECOVERY**
 - Be sure to EAT after a workout
 - CARBS – Restore used muscle energy stores
 - Protein – Help start repairing muscle damage and grow bigger
- **GET SLEEP!** In order for your muscles to fully recover, you must get an adequate amount of sleep. A majority of muscle tissue growth and repair occurs during a deep sleep.

Pre-Exercise Meals:

The Good and the Bad

☉ Why eat prior to exercise?

- ☀ Eating breakfast prior to exercise would replenish muscle and liver glycogen stores from an overnight fast.
- ☀ Eating a meal high in carbohydrates raises blood glucose levels. Muscles can then use blood glucose rather than their own glycogen stores for energy, saving the glycogen for exercise.

☉ When to eat the pre-competition meal:

- ☀ A large meal should be eaten **3-4 hours prior** to the event
 - This allows for maximum digestion, absorption, and metabolism of the nutrients.
 - Ensures that the stomach has emptied prior to the event.

☉ Foods to increase consumption of:

☀ Carbohydrates

- Digest and absorb quickly by the muscles as glucose, sparing muscle glycogen for exercise
- Carbohydrates are the primary source of energy for anaerobic and prolonged high intensity aerobic activity.
- It costs the body less energy to digest carbohydrates than protein or fat – saves your energy for your sport.

☀ Fluids

- Hydrate and prevent dehydration from occurring too soon during exercise
- 17-20 fl. oz. 2-3 hours before practice/competition
- 7-10 fl. oz. after the warm-up (10-15 minutes before practice/competition)

☉ Foods to Reduce Consumption of:

☀ Protein and Fat-

- Both **digest slowly** and require a higher metabolism for digestion and absorption, the additional metabolic heat generated may impair hot weather performance
- Too much prevents carbohydrates from quick digestion and absorption to the muscles
- A **small amount** of **lean protein** in the pre-exercise meal will provide a small amount of energy to muscle cells, decrease the breakdown of muscle protein, increase protein synthesis in muscle after the workout, and delay hunger prior to the exercise.

☀ Fiber

- Too much fiber in a pre-competition meal may lead to **gastric distress** during the competition/activity
- Fiber **decreases the absorption of glucose** and delays gastric emptying
- Avoid raw vegetables and high bran cereal

☀ Avoid high fructose based drinks 1 hour before and during exercise

- High sugar content may cause gastric distress when not given proper time to be absorbed prior to exercise

☀ Limit caffeinated beverages:

- They may cause gastro-intestinal distress

@ Pre-competition meal:

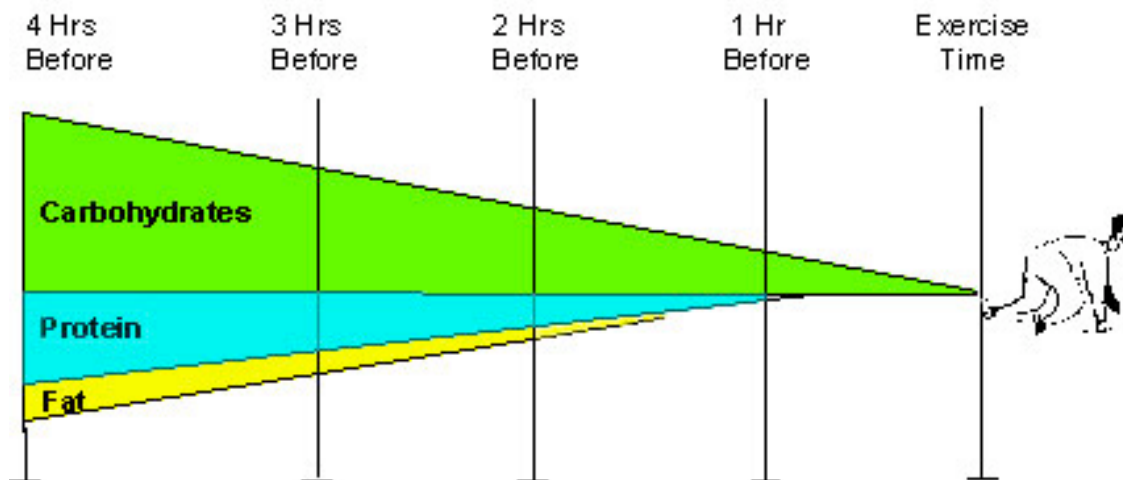
☀ 600-1,200 calories of carbohydrates

150-300 grams of carbohydrate

- **Complex-carbohydrates** that are easy to digest and are low to moderate in fiber content.
 - **Low glycemic index carbohydrates** may be best in order to avoid a spike in blood sugar and will then aid in fueling the body for prolonged exercise
 - Examples: spaghetti, cereal, wheat, rye or pumpernickel bread, banana, orange juice, apple, pears, grapefruit, oranges, strawberries, carrots, peas

☀ 2-4 oz. of lean protein: chicken, turkey, egg whites, pork, ham

- Try to avoid nuts, seeds, high-fat cuts of meat, and full-fat dairy prior to a competition or workout.
- **Low –fat, carbohydrate and protein containing foods:**
 - Chickpeas, kidney beans, lentils – eat only a small amount of these due to high fiber content
 - Low–fat dairy products: low–fat cottage cheese, skim milk, yogurt
 - Soy products: tofu and soymilk



Your pre-meal 3-4 hours before exercise can include carbohydrate with some protein and fat. As you near the time of exercise the size of the meal/snack should decrease and the selection should be primarily carbohydrates with minimal fat and protein.

Post-Exercise Nutrition: Recovery

3 Reasons to eat after exercise:

- **Refuel** for next bout of exercise
- **Rehydrate**
- **Repair** Muscles

Who should eat after exercise?

- **Athletes that benefit MOST** from post-exercise nutrition recovery **are those who:**
 - **Engage in regular intense exercise**
 - **Play tournament competitions or multiple qualifying round sports**
 - **Involved in competitive events/sports with only 1-2 days for recovery**

When to eat after exercise:

- **IMMEDIATELY:** “Window of Opportunity” – **First 2 hours post-exercise** is when the rate of CARB storage in muscles is the **FASTEST**
- For **MAXIMUM** replacement of CARB stores (GLYCOGEN):
 - Eat **small meals** consisting mainly of CARBS and some protein **every 2-3 hours** until a maximum of 2,000 Calories has been eaten depending on the level of rigorousness of the exercise
- OR**
- Eat a **large meal** high in CARBS **within 2 hours** of exercise and a CARB and protein-rich snack a few hours later

What to eat after exercise:

- **Carbohydrates:**
 - Replenishing your CARB stores is vital to the recovery process and necessary for optimal energy levels during future workouts
 - **YOUR GOAL: EAT** within **first 15 minutes of ending exercise** to initiate replenishment of CARB stores (glycogen) within the muscles
 - **Continue to eat/drink 200-300 calories from CARBS every 2 hours after exercise:** giving the body a steady stream of CARBS allows for optimal replacement of used stores
 - **Moderate to high glycemic index CARBS replace CARB stores the FASTEST**
 - Potatoes
 - Carrots
 - Honey
 - Corn
 - Peas
 - Pasta
 - Bananas or Oranges
 - Cereal
 - Rice (white or brown)
 - Bread (white or wheat)
- **Protein:**
 - “Feeding” the muscle with necessary building materials helps **stimulate muscle repair and growth**
 - Aids in replenishment of glycogen when paired with CARBS post-exercise
- **Fluids:**
 - **Gulping hydrates better** than sipping

- Drink even if you aren't thirsty
- For every **1lb. lost** due to sweat = **drink 16 oz.** of water
 - Fluids with sodium, potassium, and magnesium help SPEED UP rehydration

Glycogen and Carbohydrates

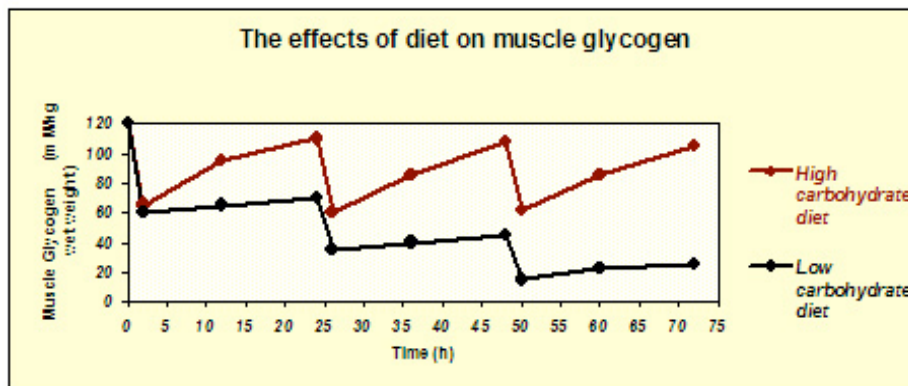
What is it?

- The storage form of **carbohydrates** for your body
 - Stored in muscles and liver
- The **major energy source** for **exercising muscles**, especially for high-intensity exercise

How much do we store?

- 1,600-1,800 calories or 400-500 grams in muscles
- 400 calories or 100 grams in liver

When is it made?



Costill, D.L., Miller, J.M. Nutrition for endurance sport: Carbohydrate and fluid balance. *Int. J. Sports Med.* 1:1-14, 1980.

- Glycogen is made when there are adequate amounts of carbohydrates in the diet for both immediate energy use and for storage

What happens when glycogen levels are low?

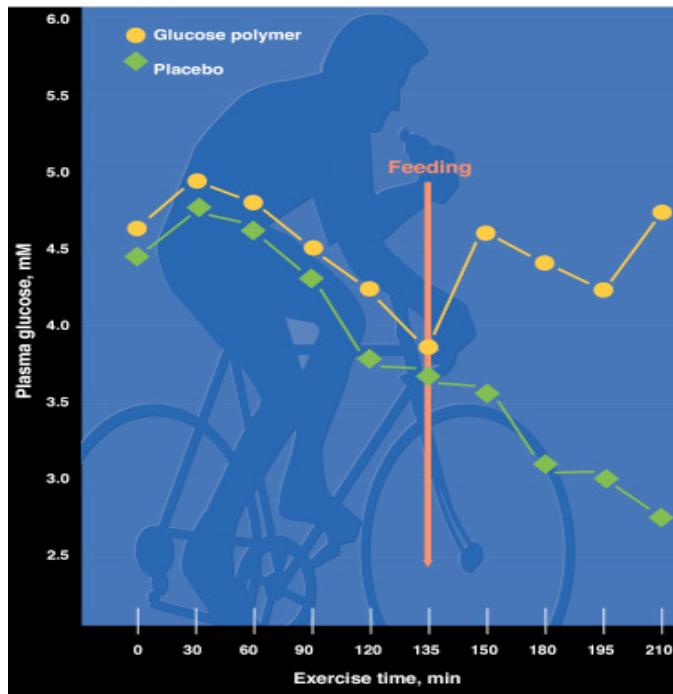
- When glycogen levels (carbohydrate levels) are low your body must switch to using **fat** as an energy source. This usually occurs after 2 hours of exercise.
- Exercise **performance slows up to 50%** because the rate of breakdown and delivery of fat for energy is **6% slower** than that of carbohydrates.
- At this point an athlete may begin to experience **nutrient related fatigue**

Pre-exercise carbohydrate needs:

- **150-300 grams** (600-1,200 calories) eaten **3-4 hours** prior to exercise
- Liquid or solid carbohydrates with little fat or fiber for optimal carbohydrate absorption
- Carbohydrates in food elevate blood glucose levels and “save” glycogen stores from use until activity

Carbohydrate needs during exercise:

7.16. Average plasma glucose concentration during prolonged high-intensity aerobic exercise...



- **60 grams (240 calories) per hour of exercise**
 - Two 20 oz. bottles of Gatorade
 - Sports gels
 - Energy bars that are high in carbohydrates and low in protein
- **Why do I need them?**
 - Carbohydrate supplements or drinks taken during exercise increase the amount of carbohydrates in the blood available to working muscles. This helps to improve mental and physical performance by saving muscle glycogen.
 - **Saved glycogen stores = postponing fatigue.** This allows you to perform at 100% capacity from the beginning to the end of activity.
 - Fatigue can be postponed up to **30 minutes** longer and may **improve performance up to 35%** by keeping carbohydrate levels UP during competition

Post-exercise:

- Recovery and replenishing used glycogen is very important, especially if you have multiple competitions within a short period of time.
- **The “window of opportunity” for maximum glycogen replacement is the first 2 hours after exercise**
 - Within the first 15 minutes of exercise eat/drink 50-75 grams Carbohydrate
 - Every 2 hours eat/drink 50-75 grams of carbohydrates until reaching 500-700 grams total consumed
- **It takes time:**
 - At optimal carbohydrate levels glycogen stores are replaced at a rate of **5-7% per hour**
 - Full glycogen replacement can take up to **24 hours**. Giving your body a steady stream of carbohydrates after exercise allows for maximal storage.
- **A person restores glycogen faster if they are resting rather than active**
 - Resting during recovery limits the carbohydrate use for immediate energy and increases the likelihood of your body being able to store the ingested carbohydrates instead.
- **High glycemic index foods stimulate glycogen replacement at a faster rate**

- White or wheat bread/rolls
- Corn flakes
- Potatoes
- Carrots
- Raisins
- Corn
- White rice
- Pasta

Weight Gain Strategies

- **Eat more calories**
 - How many?
 - **500-700 more** calories than what you are currently eating
 - **50% carbohydrates**
 - **50% protein**
 - For Example: PB&J sandwich and a glass of milk or a turkey and cheese sandwich with a banana and chocolate milk
- **Total caloric intake**
 - Need to increase the amount of calories you eat on heavy activity days.
 - If **lean muscle** is to be **increased**, the amount of calories you eat must exceed the amount of calories burned during exercise
 - You must take in enough calories to meet the physical demands of your day-to-day activities. If not, the body is forced to sacrifice lean muscle tissue for energy.
- **Nutrient dense diet:**
 - Dairy products, vegetables, fruit, beans, meat, and grains must all be a part of your diet. Eating from only a few of the food groups doesn't provide your body with all the nutrients that you need to perform at maximum capacity.
- **Post-workout snack:** Eaten within 2 hours of exercise, it should be both carbohydrate and protein rich.
 - The carbohydrate restores used muscle energy stores and the protein will stimulate muscle repair and growth.
- **Eat snacks throughout the day:**
 - Fruit, nuts, or granola.
- **Bedtime snack-** One hour before sleep, have a nutrient dense snack like a sandwich with milk or juice or a bowl of cereal
- **How long until I see results?** Muscle growth is a slow process. A half pound to a pound of muscle growth a week can occur when extra calories are combined with weight training

Weight Gain Foods

- **Milk** – high in protein, carbohydrates, Vitamins D, A, and calcium and is an easy way to take in the extra calories for muscle growth. **Chocolate milk is highest in calories!**
- **Juice** – drink juice with meals instead of water; this will keep calories and carbohydrates up.
- **Sandwiches** –
 - Peanut butter and honey sandwich for a snack
 - Add an extra piece of **cheese** to your turkey or ham sandwich for an extra **115 calories**
 - Make it a triple-decker sandwich with an extra slice of bread
- **Lean protein** –
 - chicken, eggs, fish, pork, beans, and red meat.
- **Salad** – pile on the vegetables and protein choices like beans, eggs, ham, and cheese
- **Pasta** – rich in energy and when combined with meat sauce the meal would include three food groups: meat, grain and vegetable.
- **Apple sauce** – Higher in calories than a piece of fruit
- **Add a tablespoon of olive oil to your pasta or salads** – 120 extra calories!
- **Soups** – Cream based are higher in calories
- **Peanut Butter** – 2 Tablespoons = 190 calories!

Weight Loss Strategies

- **Eat less calories** than what you are expending every day – 1 pound = 3,500 calories
 - **500 calories** is the most you should cut back daily
 - If more than 500 calories are cut, then you could experience low energy levels during exercise.
- **Never Skip Meals – Why?**
 - Lowered energy levels for exercise
 - Muscle break down for energy
 - May lead to overeating later
- **Cut out the fat** – Cut any full fat items from your diet and replace with low-fat food choices to ensure your body uses its current fat stores.
- **Avoid processed foods and “snack foods” like chips or pretzels**
- **Do not fry foods in oil or fat.** Bake, broil, sauté, or microwave foods instead
- Eat plenty of **vegetables throughout the day.**
- **Increase dietary fiber** to help **satisfy** hunger by choosing whole wheat breads, fruits, and vegetables.
- **Eat high-quality proteins that are low in fat.**
 - Lean ground meat, chicken, turkey, pork, ham, Canadian bacon, fish, eggs, skim milk
- **Eat smaller food portions:** By decreasing the amount you eat at meals by $\frac{1}{4}$, you will decrease the number of calories you eat by $\frac{1}{4}$
- **Eat slowly:**
 - It takes time for your body to sense that it is full
 - This will help prevent overeating
- **How long until I see results?** Only lose **1-2 lbs/week** safely. This is to ensure that you maximize fat loss and minimize muscle loss.

1 lb. = 3,500 calories: 500 calories fewer a day for 7 days. Losing weight is a DAILY awareness of calorie intake vs. expenditure.

Weight Loss Foods

- **Choose:**
 - **Skim milk** versus whole or chocolate milk
 - **Water** instead of Gatorade or juice at meals or during the day
 - **Jam** instead of butter on toast
 - **Fat-free or low-fat dressing** instead of full fat dressing
 - **Broth based soup** instead of creamy
 - Soups are great because the high water content fills you up and keeps you hydrated!
 - **Do eat**
 - **Fruits and vegetables** as snacks
 - **They are higher in fiber to help keep you full!**
 - **Lower in fat and calories**
 - 2 pieces of whole fruit
 - 2 cups of sliced fruit or berries
 - Eat lots of fresh, canned, or frozen vegetables
 - **Low-fat meats** like chicken or turkey instead of bacon, sausage, or pepperoni
 - **Whole grains** – they keep you full longer due to the fiber content
 - **Reduce intake of:**
 - **Fried foods** such as French fries, chicken fingers, hash browns, onion rings
 - **Sweets** like cakes, cookies and ice cream
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Grocery Shopping List for Weight Loss

Grains (6-11 servings/day)

Whole wheat bread
Noodles/pasta
Bagels
English Muffins
Pita bread
Tortillas
Cold or hot cereal
Rice
Crackers (Animal and Saltine)
Rice cakes

Fruits (3 per day)

Apples/applesauce
Oranges or grapefruits
Bananas
Grapes
Kiwi
Raisins
Peaches
Cranberries/Craisins
Peaches
Plums
Pineapple
Canned fruit in juice
Melons
Berries (fresh or frozen)

Meats/Meat Substitute (5-8 ounces)

Tuna fish
Egg beaters
Lean beef & pork
Turkey (ground or sliced)
Chicken (without the skin)
Beans
Light tofu

Legumes

Vegetables (3 or more/day)

Carrots
Celery
Broccoli
Cauliflower
Green/red peppers
Tomatoes
Brussel sprouts
Lettuce (dark green leaves)
Cabbage
Onions, garlic
Squash and zucchini
Beans

Water chestnuts

Spinach
Mushrooms, radishes
Bean sprouts

Milk and Dairy (3 per day)

Nonfat yogurt
Skim milk/soy milk
Mozzarella/swiss cheese
Low-fat cottage cheese
Non-fat sour cream
Low-fat cheese

Condiments

Olive oil
Ketchup
Low-fat salad dressing
Low-fat Miracle Whip/ Cool Whip
Reduced sugar jam/jelly
Mustard
Soy sauce and salsa

Alcohol:

Holding You Back from Achieving Your Best

Drinking before or after exercise:

- **Decreases** strength, power, speed, **muscular and cardiovascular endurance**, and aerobic metabolism
- **Causes dehydration and slows down rehydration** after exercise
- **Cancels out** possible **physiological gains** from a hard workout/game when paired with a recovery focused diet
- **Prevents muscle recovery** (growth and repair)
 - **Obstructs protein production** – decreasing muscle growth and repair after exercise
 - Muscles do the most growth and repair during sleep via increased levels of Human Growth Hormone (HGH), **Alcohol decreases HGH release up to 70%**
 - **Decreases testosterone** levels
 - Substituting alcohol for quality carbohydrates in post-exercise recovery **decreases glycogen replacement and extends recovery time**
 - **Remember! Improper recovery time & diet will decrease your strength & performance levels throughout the season!!**

Alcohol's affect on memory:

- Converting things to memory is a process which takes time and proper SLEEP
- Alcohol **affects** your **natural sleep cycle** even when drinking up to 6 hours before bed

Food for thought:

- Consuming five or more alcoholic beverages in one night can affect brain and body activities for up to 3 days

Nutrition and weight management

- Use requires increased conditioning in order to maintain your weight
 - Holds little nutritional value
 - High in calories and is not available to muscles for energy
 - Alcohol **calories or carbohydrates ARE NOT converted to muscle glycogen**
 - Body **treats alcohol calories like fat** and converts its sugars to fatty acids
- **Alcohol increases the appetite** – causes you to take in excess calories by taking you longer to feel full. Excess calories will then be converted to fat for storage

Inhibits absorption of nutrients

- **Thiamin (B1)** - plays key role in carbohydrate, protein and fat metabolism. Aids in making hemoglobin, the oxygen carrying compound on red blood cells
- **Vitamin B12** – helps maintain healthy red blood cells and nerves
- **Folic Acid** – required to make new cells and lack of it decreases oxygen carrying capacity and therefore hurts endurance
- **Zinc** – essential to metabolic processes and therefore a lack of it could affect endurance as well

Drinks that contain congeners – whiskey, cognac, and red wine are more likely to cause hangovers than other alcoholic beverages. The best hangover remedy is to not drink excessively in the first place. If you do have a hangover, drink a salted beverage with CARBS.

How do the drinks measure up?

		Calories
Beer (regular)	12 fl. oz.	117
Beer (light)	12 fl. oz.	99
Gin, Rum, Vodka 80 Proof	1.5 fl. oz.	97
Gin, Rum, Vodka 86 Proof	1.5 fl. oz.	105
Gin, Rum, Vodka 90 Proof	1.5 fl. oz.	110
Wine, Red	4 fl. oz.	85
Wine, White	4 fl. oz.	80

Hydration Tips

2 Hours before exercise: drink at least 2 cups (16 oz.) water

5-15 minutes before: drink 1 cup (8 oz.) water

Every 10-15 minutes during: ½ cup – 1 cup water
In hot weather drink as often as possible

Sport Tips:

- **COOL fluids do DOUBLE DUTY:**
 - Help COOL the Body
 - Leaves the stomach FASTER for better hydration
- Carry around a bottle of water during the day to keep you drinking
- Drink even if you are not thirsty – Thirst is our body's way of saying that we are already dehydrated
- Gulping down water/sports drink hydrates the body FASTER than sipping
- Sports drinks are great for long duration activities and hot weather- the CARBS keep you energized and fluid and electrolytes keep you hydrated

How to tell if you are dehydrated:

1. Weight: Weight before & after exercise helps determine how much you need to drink.
Every 1 lb. of weight lost via sweat = 16 oz. of Fluids
2. Thirst = Dehydration...drink even if you aren't thirsty!
3. Urine: COLOR should be light yellow and not have a strong ODOR

Using Nutrition to Prevent Muscle Cramping

What is a muscle cramp?

A painful involuntary skeletal muscle contraction that will not relax

Why do athletes get muscle cramps?

1. **Dehydration**- large loss of water and electrolytes
2. **Lack of minerals** in food or drinks
3. **Muscle fatigue** due to inadequate training

How you can AVOID them..

1. Guzzle plenty of **fluids** before, during, and after exercise
2. While exercising in the heat or for longer than 30 minutes, grab an **electrolyte enhanced beverage**, like **Gatorade** or **Powerade**
3. Devour **foods high in electrolytes and minerals (fruits & vegetables)**
4. **Stretch** before exercise
5. **Gradually increase intensity and duration** of exercise
6. Wear **loose fitting clothing**

Foods high in minerals

- **Calcium**: dairy products: milk, cheese, yogurt
- **Magnesium**: nuts, green leafy vegetables, milk, meat

Foods high in electrolytes

- **Potassium**
 - o Fruits and vegetables: bananas and potatoes
- **Sodium**
 - o Processed/canned goods: soups, canned vegetables, condiments, tomato sauce, deli meat
 - o Sports drinks or enhanced water
- **Chloride**
 - o Table salt: 60% chloride
 - o Processed foods/canned goods

What to do if you get a cramp:

Stretch, ice, massage, gradually begin to move it

Foods High in Protein

Shortcuts:

An ounce of meat/fish = about 7 grams of protein

3 ounces of meat is about the size of a deck of cards

Protein Source	Grams of Protein
Beef	
Hamburger patty (4 oz.)	28
Steak (6 oz.)	42
Chicken	
Chicken breast (3.5 oz.)	30
Chicken thigh	10
Drumstick	11
Wing	6
Ground chicken meat (4 oz.)	35
Fish	
Fillet or steaks (3.5 oz.)	22
Tuna (6 oz. can)	40
Pork	
Pork chop	22
Loin or tenderloin (4 oz.)	29
Ham (3 oz.)	19
Ground pork (3 oz. cooked)	22
Bacon (1 slice)	3
Canadian bacon (1 slice)	5-6

Eggs & Dairy	
Egg – large	7
Milk – 1 cup (any kind)	8
Cottage cheese – ½ cup	15
Yogurt - 1 cup	8-12 (check label)
Greek yogurt -1 cup	12-17
Soft cheeses (mozzarella, brie, camembert) 1 oz.	6
Medium cheeses (cheddar, swiss, provolone) 1 oz	7-8
Hard cheeses (parmesan) 1 oz.	10
Beans	
Tofu 1 oz.	2.3
Soy milk - 1 cup	6-10
Most beans (black, pinto, lentils , etc) ½ cup cooked	7-10
Soy beans – ½ cup cooked	14
Split peas – ½ cup cooked	8
Nuts & Seeds	
Peanut butter – 2 Tablespoons	7
Almonds - ¼ cup	8
Peanuts – ¼ cup	9
Cashews – ¼ cup	5
Pecans – ¼ cup	2.5
Sunflower seeds – ¼ cup	6
Pumpkin seeds – ¼ cup	19
Flax seeds – ¼ cup	8

Starchy Carbohydrates

What is a starchy carbohydrate? Cereals, grains, pasta, bread, crackers, starchy vegetables, beans, peas, and lentils are all starches

What is a typical serving?

- ½ cup cereal, grain, pasta, or starchy vegetables
- 1 slice of bread
- ¾ to 1 oz. of snack foods (most snack foods also contain added fat)

Nutrition Tips:

- Most starches are good sources of B-Vitamins
- Foods containing whole grains are good sources of fiber
- Beans and peas are good sources of protein and fiber
- Choose starches with little added fat
- Bagels and muffins can be as large as 4 oz. = 4 servings
- Most serving sizes are meant to be measured after cooking

Food	Serving Size
Breads:	
Bagel	½ (1 oz.)
White, wheat, rye bread	1 slice (1 oz.)
English muffin	½
Hamburger bun	½
Pita (6 inches across)	½
Tortilla (corn or flour)	1
Waffle (4 ½ inches)	1
Cereals & Grains:	
Cereals	1 cup
Couscous	1/3 cup cooked
Granola (low fat)	¼ cup
Grits, kasha, oats, pasta, rice	½ cup cooked
Starchy Vegetables:	
Baked beans	1/3 cup
Corn	½ cup
Mixed Vegetables with corn and peas	1 cup
Peas	½ cup
Potato, baked or broiled	1 small (3 oz.)
Yam or sweet potato	½ cup
Crackers & Snacks:	
Animal crackers	8
Graham crackers 2 ½ inch square	3
Popcorn	3 cups
Pretzels	¾ oz.
Rice cakes	2
Saltines	6
Snack chips (fat free tortilla or chips)	15-20 (¾ oz.)
Dried beans, peas, lentils:	
Garbanzo, pinto, kidney, white, split, black-eyed	½ cup

Lima beans	2/3 cup
Other Starchy Food:	
Croutons	1 cup
French Fries	16-25 (3 oz.)
Pancake (4 inches across)	2
Muffin, small	1 (1 ½ oz.)
Sandwich crackers filled w/ cheese or peanut butter	3
Taco shell	2