State of California – Military Department
California Cadet Corps

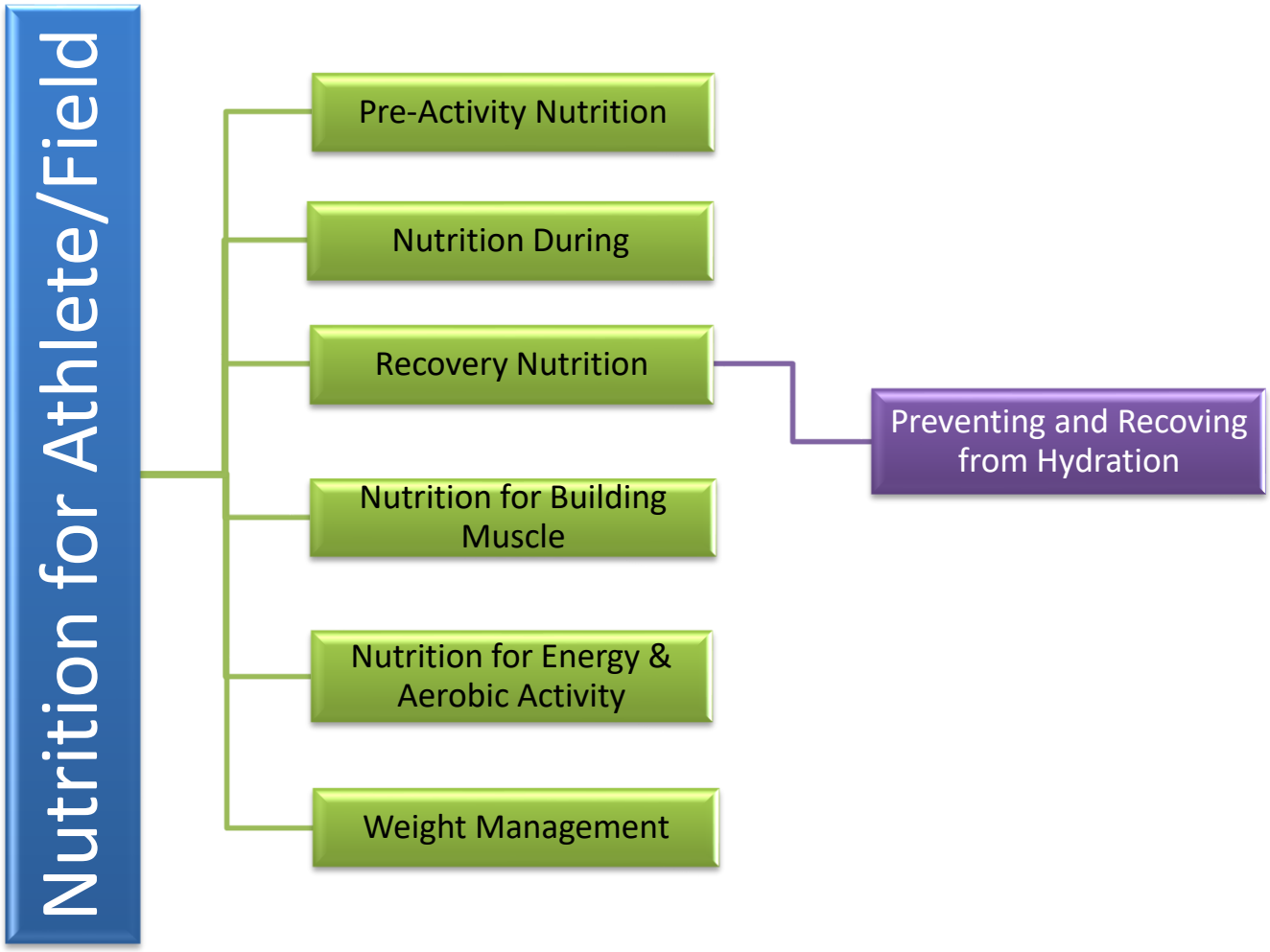
CURRICULUM ON Wellness: Nutrition of the Athlete/Field

Strand W4 Nutrition for the Student

Level 11

This Strand is composed of the following components:

A. Nutrition for the Student
B. Nutrition for the Cadet
C. Nutrition for the Athlete/Field



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C. Nutrition for Athlete/Field

STANDARD #4: Cadets participate in a variety of fitness and wellness activities.

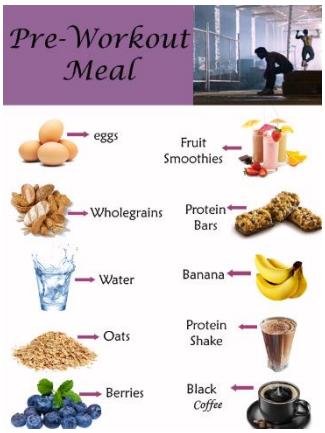
OBJECTIVES

DESIRED OUTCOME (Self-Mastery)
Cadets will embrace a healthy diet and apply nutritional facts, practices, and recommendations to their activity and exercise regimens.

Plan of Action:

1. Describe appropriate pre-exercise nutrition for short and longer exercise periods
2. Give examples of appropriate foods to eat prior to exercise, and when
3. Describe the benefits of Supplements to an exercise program
4. Describe when and how much water you should consume pre-exercise
5. List negative effects on exercise from nutritional choices
6. Plan time and amount of intake of carbohydrates, proteins fats and sugars before, during, and after workouts
7. Define and explain BRAT
8. Define recovery phase, post-workout and post-workout nutritional window
9. Describe the nutrients needed for building muscle and the range for appropriate intake
10. Execute calculations for energy needed for aerobic activity for an individual's weight
11. Explain the two required sources for energy
12. Define and explain hypohydration, hyper hydration, and rehydration
13. Explain the three levels of proactive weight management
14. Define obesogenic
15. Describe how weight management is an epidemic nationwide
16. Define the difference between vigorous and moderate activities/exercise.

C1. Pre-Activity Nutrition



Athletes and fitness enthusiasts are always looking for ways to improve their performance and achieve their goals. Good nutrition can help your body perform better and recover faster after each workout.
Optimal nutrient intake prior to exercise will not only help you maximize your performance but also minimize muscle damage. (Semeco, 2018)

Here is everything you need to know about pre-workout nutrition. Knowing what to eat is important.
Fueling your body with the right nutrients prior to exercise will give you the energy and strength you need to perform better. Each macronutrient has a specific role before a workout. However, the ratio in which you need to consume them varies by the individual and type of exercise.

Here is a brief look at the role of each macronutrient:

- Carbs:
  - Your muscles use the glucose from carbs for fuel.
  - Glycogen is the way the body processes and stores glucose, mainly in the liver and muscles.
  - For short- and high-intensity exercise, your glycogen stores are your muscles' main source of energy
  - But for longer exercises, the degree to which carbs are used depends on several factors. These include the intensity, type of training and your overall diet.
  - Your muscles' glycogen stores are limited. As these stores become depleted, your output and intensity diminish.
  - Studies have consistently shown that carbs can increase glycogen stores and utilization while boosting carb oxidation during exercise.
  - Carb loading, which involves consuming a high-carb diet for 1–7 days, is a well-known method to maximize glycogen stores.

- Protein
  - Many studies have documented the potential of pre-workout protein consumption to improve athletic performance.
  - Eating protein (alone or with carbs) prior to exercise has been shown to increase muscle protein synthesis
  - One study showed a positive anabolic response after participants consumed 20 grams of whey protein before exercise.
  - Other benefits of eating protein before exercise include:
    - A better anabolic response, or muscle growth
    - Improved muscle recovery Increased strength and lean body mass
    - Increased muscle performance

- Fat While glycogen is used for short- and high-intensity bouts of exercise, fat is the source of fuel for longer and moderate-to-low-intensity exercise.
- Some studies have investigated the effects of fat intake on athletic performance. However, these studies looked at high-fat diets over a long period, rather than prior to exercise.
- For example, one study showed how a four-week diet consisting of 40% fat increased endurance running times in healthy, trained runners.

Summary: Carbs help maximize glycogen stores for high-intensity exercise, while fat helps fuel your body for longer, less intense workouts. Meanwhile, protein improves muscle protein synthesis and aids recovery.

The timing of your meal is also an important aspect of pre-exercise nutrition. To maximize the results of your training, try to eat a complete meal containing carbs, protein and fat 2–3 hours before you exercise. However, in some cases, you may not be able to get in a full meal 2–3 hours before working out. In that case, then you can still eat a decent pre-workout meal. However, keep in mind that the sooner you eat before your workout, the smaller and simpler the meal should be. If you eat 45–60 minutes prior to your workout, choose foods that are simple to digest and contain mainly carbs and some protein. This will help prevent any stomach discomfort during exercise.

Which foods and how much to eat depends on the type, duration and intensity of the workout. A good rule of thumb is to eat a mixture of carbs and protein prior to exercise. If you eat fat with your pre-workout meal, then it should be consumed at least a few hours before your workout. Here are some examples of balanced pre-workout meals:

If your workout starts within 2-3 hours or more:

- Sandwich on whole-grain bread, lean protein and a side salad
- Egg omelet and whole-grain toast topped with avocado spread and a cup of fruit
- Lean protein, brown rice and roasted vegetables

If your workout starts within 2 hours:

- Protein smoothie made with milk, protein powder, banana and mixed berries
- Whole-grain cereal and milk
- A cup of oatmeal topped with banana and sliced almonds
- Natural almond butter and fruit preserve sandwich on whole-grain bread

If your workout starts within an hour or less:

- Greek yogurt and fruit
- Nutrition bar with protein and wholesome ingredients
- A piece of fruit, such as a banana, orange or apple

For best results, experiment with different timings and nutrient compositions. Note that these are separate examples – don't eat all of them from any category!

Supplement use is common in sports and can be useful before exercise. These products may enhance performance, improve strength, increase lean body mass and reduce fatigue. Some of the best pre-workout supplements are:

- Creatine is probably the most commonly used sports supplement. It has been shown to increase muscle mass, muscle fiber size and muscle strength and power, all while delaying fatigue.
- Even though it's beneficial to take creatine before a workout, it seems to be even more effective when taken after a workout.
- Taking 2–5 grams of creatine monohydrate per day is effective.

- Caffeine
- Branche-Chain Amino Acids (BCAAs) BCAAs refer to the essential amino acids valine, leucine and isoleucine.
- Studies have shown that taking BCAAs before workouts helps decrease muscle damage and increase muscle protein synthesis.
- A dose of 5 grams or more, at least an hour prior to exercise, is effective.

- Beta-Alanine
- Beta-alanine is an amino acid that increases your muscle stores of carnosine. It has been shown to be most effective for short- and high-intensity exercises. It does this by increasing exercise capacity and muscle endurance while reducing fatigue
- The recommended daily dose is 2–5 grams, of which at least 0.5 grams should be consumed prior to your workout.
- Multi-Ingredient Pre-Workout Supplements. Some people prefer products that contain a blend of the supplements mentioned above. The combination of these ingredients may have synergistic effects and improve performance significantly. Caffeine, creatine, beta-alanine, branched-chain amino acids, arginine and B vitamins are among the most commonly used ingredients in these products.
- These pre-workout supplements have been shown to increase work output, strength, endurance, anaerobic power, reaction time, focus and alertness.
- The particular dose depends on the product, but it's generally recommended to take them about 30–45 minutes before exercise.

Hydration is also crucial pre-exercise. Your body needs water to function. Good hydration has been shown to sustain and even enhance performance, while dehydration has been linked to significant decreases in performance. It's recommended to consume both water and sodium before exercise. This will improve fluid balance. **The American College of Sports Medicine (ACSM) recommends drinking 16–20 ounces (0.5–0.6 liters) of water at least four hours before exercise and 8–12 ounces (0.23–0.35 liters) of water 10–15 minutes before exercise.** Additionally, they recommend consuming a beverage that contains sodium to help retain fluids.

Table II: Carbohydrate requirements for physical activity[2,3,5,12]

Physical activity level	g/kg BW/day	Comments
Daily or habitual carbohydrate requirements		
ACSM		
Athletes	6-10 g/kg BW/day	Depends on the athlete's total daily energy expenditure, type of sport, gender and environmental conditions.
ISSN		
General physical activity, 30-60 minutes/day, 3-4 times a week	3-5 g/kg BW/day	Complex carbohydrates. Low to moderate GI. Concentrated carbohydrates.
Moderate- to high-intensity volume, 2-3 hours/day, 5-6 times a week	5-8 g/kg BW/day	
High-volume, intense exercise, 3-6 hours/day, 1-2 sessions, 5-6 time a week	8-10 g/kg BW/day	
IOC		
Low-intensity or skill-based activities	3-5 g/kg BW/day	Include pre-, during and post-training intake. Individual tolerance and preference. Nutrient-dense choices.
Moderate exercise programme, ~ 1 hour/day	5-7 g/kg BW/day	
Endurance programme, moderate to high intensity, 1-3 hours/day	6-10 g/kg BW/day	
Strength-trained athletes	4-7 g/kg BW/day	
Extreme commitment, moderate to high intensity, > 4-5 hours/day	8-12 g/kg BW/day	
Pre-event/training carbohydrate requirements		
ACSM		
Pre-event meal	200-300 g, 3-4 hours prior	Low in fat and fibre. High carbohydrates, moderate protein.
ISSN		
Carbohydrate loading	8-10 g/kg BW/day for 1-3 days prior to event	High GI carbohydrate diet.
Pre-event meal	1-2 g/kg BW carbohydrates 3-4 hours prior to event	
IOC		
General fuelling up for events > 90 minutes	7-12 g/kg BW per 24 hours	Low in fibre or residue. Individual tolerance. Avoid high-fat protein and fibre (especially if there are gastrointestinal complaints). Low GI if no carbohydrates during exercise.
Carbohydrate-loading preparation for events > 60 minutes sustained or intermittent exercise	36-48 hours of 10-12 g/kg BW per 24 hours	
Pre-event fuelling before exercise > 60 minutes	1-4 g/kg BW consumed 1-4 hours prior to exercise	

Summary: To maximize your performance and recovery, it's important to fuel your body with the right nutrients before a workout. Carbs help maximize your body's ability to use glycogen to fuel short- and high-intensity exercises, while fat helps fuel your body for longer exercise sessions. Eating protein helps improve muscle protein synthesis, prevent muscle damage and promote recovery. Good hydration is also linked to enhanced performance. Pre-workout meals can be eaten three hours to 30 minutes before a workout. However, choose foods that are easy to digest, especially if your workout starts in one hour or less. This will help you avoid stomach discomfort. Additionally, many different supplements can aid performance and promote recovery. At the end of the day, simple pre-workout nutrition practices can go a long way in helping you perform better and recover faster. (Semeco, 2018)

During event or training carbohydrate requirements		
ACSM		
During exercise > 60 minutes	0.7 g/kg BW/hour or 30-60 g/hour	This is especially important when no pre-event meal has been consumed or in the case of exercise in heat or humidity. 6-8% carbohydrate solution. Primarily glucose. Fructose alone is not as effective and can cause diarrhoea. Mixtures of glucose and fructose, other simple sugars and maltodextrins seem effective. If the same total amount of carbohydrates are provided, the form of carbohydrates do not appear to matter (sports drink, gel or a snack).
ISSN		
During events > 60 minutes	30-60 g/hour	Body oxidises 1-1.1 g/carbohydrates/minute or 60 g/hour 6-8% carbohydrate solution. Start drinking early and continue drinking small amounts every 15-20 minutes. Combination carbohydrates increase oxidation (up to 1.2-1.75 g carbohydrates/minute) (glucose, fructose, sucrose and maltodextrin recommended, not large amounts of fructose because of gastrointestinal discomfort).

Table II: Carbohydrate requirements for physical activity[2,3,5,12]

Physical activity level	g/kg BW/day	Comments
IOC		
During brief exercise < 45 minutes	Not needed	Practice plan before event. Higher carbohydrate intakes associated with increased exercise performance. Multiple transportable carbohydrates should be included (glucose and fructose mixtures) to increase carbohydrate oxidation.
During sustained high-intensity exercise lasting 45-75 minutes	Small amounts including mouth rinse	
During endurance exercise including "stop and start" sports lasting 1-2.5 hours	30-60 g/hour	
During ultra-endurance exercise lasting > 2.5-3 hours	Up to 90 g/hour	
Post-event or training carbohydrate requirements		
ACSM		
After exercise	1.0-1.5 g/kg BW during first 30 minutes, and again every 2 hours for 4-6 hours	Adequate fluid, electrolytes, energy and carbohydrates.
ISSN		
Post-exercise carbohydrate ingestion	1.5 g/kg BW or 0.6-1.0 g/kg BW during the first 30 minutes, and again every 2 hours for 4-6 hours	Within 30 minutes post-exercise.
IOC		
Speedy refuelling, < 8 hours recovery between two fuel-demanding sessions	1-1.2 g/kg BW/hour for first 4 hours, then resume daily fuel needs	Small, regular snacks. Compact carbohydrate-rich foods.

ACSM: American College of Sport Nutrition, BW: body weight, GI: glycaemic index, IOC: International Olympics Committee, ISSN: International Society for Sports Nutrition

The bottom line is that energy is made from carbohydrates, proteins, fats, and sugars. The suggested levels for carbohydrates is 5-12g/kg per day because it contributes to 50% of the total energy being used. This means depending on how intense the workout is going to be the athlete should consume 5-12 grams per kg of body weight per day to meet the caloric need. The recommendation time to ingest carbohydrates before a workout is not an exact science; common knowledge has been 30 minutes to an hour before exercising. The protein intake only contributes to 12-15 % of the energy for exercise, the recommendation of protein intake is .8-1.2g/kg per day, but it is not recommended to intake protein

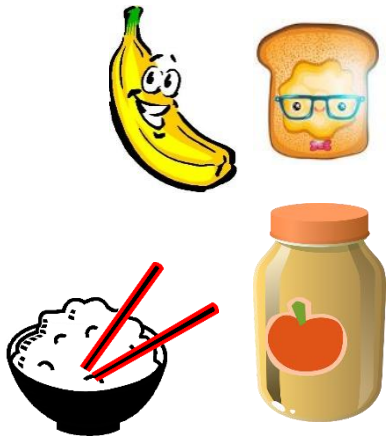
immediately before exercise. Do not intake fats before workouts, even though fats contribute to 25-30% of total energy for adolescents to use during exercise (Bagchi,2019).

Check on Understanding:

1. Between carbs, proteins, and fat, which is most important for pre-exercise nutrition?
2. How long before exercise should you consume a balance meal?
3. How long before a meal should you consume water, and how much?

C2. Nutrition during Activity

During-activity-nutrition should not be neglected during routine workouts and competition days. Neglecting to intake nutrients during exercise can result in **hypoglycemia** (a drop in blood glucose levels), muscle fatigue and overall loss of energy. During activities the athlete must focus on optimal fluid intake (hydration), and the intake of carbohydrates in moderation and timing to athletic preference or performance needed to compete. Fructose, glucose, and sucrose (sugars) should not be ingested at high rates during the activity phase because it can cause gastrointestinal (GI) issues. There is inconclusive evidence on intake amounts or patterns for proteins during the activity phase (Potgieter, 2013).



Limit your intake to low-GI-impacting carbohydrates like bananas, rice, applesauce, and toast or "BRAT diet". This can include crackers, peanut butter, puffed rice cakes, dry cereals or cereal bars, tortillas, or tortilla chips etc.

Check on Understanding:

1. It is okay to neglect during-activity nutrition intake. (T/F)
2. What are the three nutrition items to avoid during exercise? _____, _____, _____.
3. What is the mnemonic for low-GI-impacting carbohydrate foods recommended as during-exercise fuel intake?

C3. Recovery Nutrition

Recovery nutrition is the replenishing and rebuilding phase for the human body after intense activity. It is important to ensure that the correct nutrients are taken in **post-workout** (also known as the **recovery phase)**.

Key ingredients specifically for post-workout to influence the best recovery are maltodextrin, whey, and electrolytes. **Maltodextrin** is a white starchy additive used in food products. The *function* (what these items are doing during the recovery phase) they perform is glycogen replenishment and muscle recovery/rebuilding. Glycogen is a form of glucose that stores energy. Product examples for this phase are things like Gatorade G Series, Recovery drinks, and Power Bars. These nutrients are key to replacing macronutrients to balance the body throughout the recovery phase.

The **post-workout nutrition window** is a time period where the body responds the best in the recovery phase input of nutrients (this is not a proven scientific fact; it is just an adopted notion of physical trainers). There is no exact time window or expectation to intake post-workout or recovery nutrients.

Post-workout drinks with ergogenic aids (ergogenic means enhancing physical performance) have great success in body builders because the nutrients get shuttled into the muscles efficiently (Bagchi,2019).

Check on Understanding:

1. Post-workout is also known as _____ phase.
2. What are the functions of the nutrients during post-workout?
    a) Fat replacement
    b) Cool-down
    c) Hunger abatement
    d) Glycogen replenishment & muscle recovery
3. Post-workout nutrition window is a proven, specific timeframe (T/F)

C4. Nutrition for Building Muscle

In order to build muscle, it is not only the work done to the muscle, but it is also the nutrients ingested that helps the muscle grow. The body must utilize proteins inside the body to make sure that muscles repair from doing work (Bagchi,2019). The types of protein are Meats, Poultry, Seafood, Eggs, Nuts & Seeds, and Beans & Peas (see descriptions in W4A Lesson 7). The rule of thumb is to follow a diet that fits the individual's workout regimen. Maintaining a balance of what the individual's body uses is key to building muscles. The bottom line is that the body needs the correct amount of protein that matches the workload to fill the muscle fibers to build muscle. The recommended daily protein intake is .8 to 1.2g/kg per day (Bagchi,2019). For example a 165 lb person is roughly 75kg, they should intake minimum 75kg x.8= 60 grams of protien, maximum 75x 1.2= 90 grams of protien. For reference a 6 ounce steak is roughly 170 grams of protien (1 oz=28.3 grams).

Check on Understanding:

1. What is the minimum amount of protein an individual should ingest per day?
    a) 60 grams
    b) 90 grams
    c) .8 grams per kilogram of body weight
    d) 1.2 grams per kg of body weight
2. What nutrient does the body rely on to build muscles?
3. You should try to follow a diet based on your _____ regimen.

C5. Nutrition for Energy & Aerobic Activity

Aerobic activity consists of exercises that burn through calories during the activity. This type of activity uses nutrition to make energy throughout the exercise. When doing aerobic exercise, it is important to balance your nutrition to ensure optimum performance. To establish that balance the two required sources of energy are carbohydrates and proteins. Other type of caloric intake are a reasonable amount of fats, sugars, and other micronutrients such as calcium, sodium and potassium (Bagchi, 2019). Most important is to ensure the recommended daily amount of carbohydrates is met, which is 5 to 12 grams per kilogram per day. For example, for a 165 lb person (roughly 75 kg) the minimum amount of carbohyradtes to be ingested is 75 kg x 5g = 375 grams of carbohydrates and the maximum amount is

75 kg x 12 g = 900 grams of carbohydrates. 15 grams of carbohydrates is one serviing and one serving examples are found in the following charts below.

Bread

Food	Serving Size
Bagel	¼ large bagel (1 oz.)
Biscuit	1 biscuit (2½ inches across)
Bread, reduced-calorie, light	2 slices (1½ oz.)
Cornbread	1¾ inch cube (1½ oz.)
English muffin	½ muffin
Hot dog or hamburger bun	½ bun (¾ oz.)
Naan, chapati, or roti	1 oz.
Pancake	1 pancake (4 inches across, ¼ inch thick)
Pita (6 inches across)	½ pita
Tortilla, corn	1 small tortilla (6 inches across)
Tortilla, flour (white or whole-wheat)	1 small tortilla (6 inches across) or ⅓ large tortilla (10 inches across)
Waffle	1 waffle (4-inch square or 4 inches across)

Cereals and Grains* (Including Pasta and Rice)

Food	Serving Size
Barley, couscous, millet, pasta (white or whole-wheat, all shapes and sizes), polenta, quinoa (all colors), or rice (white, brown, and other colors and types)	⅓ cup
Bran cereal (twigs, buds, or flakes), shredded wheat (plain), or sugar-coated cereal	½ cup
Bulgur, kasha, tabbouleh (tabouli), or wild rice	½ cup
Granola cereal	¼ cup
Hot cereal (oats, oatmeal, grits)	½ cup
Unsweetened, ready-to-eat cereal	¾ cup

*Serving sizes for all grains and pasta measure cooked foods.

Starchy Vegetables*

Food	Serving Size
Cassava, dasheen, or plantain	⅓ cup
Corn, green peas, mixed vegetables, or parsnips	½ cup
Marinara, pasta, or spaghetti sauce	½ cup
Mixed vegetables (with corn or peas)	1 cup
Potato, baked with skin	¼ large (3 oz.)
Potato, French-fried (oven-baked)	1 cup (2 oz.)
Potato, mashed with milk and fat	½ cup
Squash, winter (acorn, butternut)	1 cup
Yam or sweet potato, plain	½ cup (3½ oz.)

*Serving sizes for all starchy vegetable measure cooked vegetables.

Crackers and Snacks

Food	Serving Size
Crackers, animal	8 crackers
Crackers, graham	3 crackers (2½ inch squares)
Crackers, saltine or round butter-type	6 crackers
Granola or snack bar	1 bar (¾ oz.)
Popcorn	3 cups, popped
Pretzels	¾ oz.
Rice cakes	2 cakes (4 inches across)
Snack chips, baked (potato, pita)	About 8 chips (¾ oz.)
Snack chips, regular (tortilla, potato)	About 13 chips (1 oz.)

Beans and Lentils

Food	Serving Size
Baked Beans	⅓ cup
Beans (black, garbanzo, kidney, lima, navy, pinto, white), lentils (any color), or peas (black-eyed and split), cooked or canned, drained and rinsed	½ cup

Milk and Milk Substitutes

1 carbohydrate choice = 12 grams carbohydrate

Food	Serving Size
Milk (nonfat, 1%, 2%, whole)	1 cup
Rice drink, plain, fat-free	1 cup
Yogurt (including Greek), plain or sweetened with an artificial sweetener*	⅔ cup (6 oz.)

*Yogurt is highly variable in carbohydrate content, so check the food label to be sure.

Non-starchy Vegetables

1 serving = 5 grams carbohydrate

Food	Serving Size
Vegetables, cooked	½ cup
Vegetables, raw	1 cup
Vegetable juice	½ cup

Non-starchy vegetables include asparagus, beets, broccoli, carrots, cauliflower, eggplant, green beans, greens, (collard, dandelion, mustard, purslane, turnip), mushrooms, onions, pea pods, peppers, spinach, squash (summer, crookneck, zucchini), and tomatoes. Some vegetables, such as salad green (lettuce, romaine, spinach, and arugula), have so little carbohydrate that they are considered free foods.

Fruits

1 carbohydrate choice = 15 grams carbohydrate

NOTE: the weights listed include skin, core, and seeds.

Food	Serving Size
Applesauce, unsweetened	½ cup
Banana	1 extra-small banana, about 4-inches long (4 oz.)
Blueberries	¾ cup
Dried fruits (blueberries, cherries, cranberries, mixed fruit, raisins)	2 Tbsp.
Fruit, canned	½ cup
Fruit, whole, small (apple)	1 small fruit (4 oz.)
Fruit, whole, medium (nectarine, orange, pear, tangerine)	1 medium fruit (6 oz.)
Fruit juice, unsweetened	½ cup
Grapes	17 small grapes (3 oz.)
Melon, diced	1 cup
Strawberries, whole	1¼ cup

Sweets and Desserts

1 carbohydrate choice = 15 grams carbohydrate

Food	Serving Size
Brownie, small, unfrosted	1 ¼-inch square, ⅞-inch high (about 1 oz.)
Cake, unfrosted	2-inch square (about 1 oz.)
Candy, hard	3 pieces
Ice cream, regular	½ cup
Pudding, sugar-free or sugar-and fat-free (made with fat-free milk)	½ cup
Sandwich cookie with crème filling	2 small cookies (about ¾ oz.)

2 carbohydrate choice = 30 grams carbohydrate

Food	Serving Size
Candy, chocolate, dark or milk	1¾ oz.
Cupcake, frosted	1 small cupcake (about 1¾ oz.)
Doughnut, yeast-type, glazed	1 doughnut, 3¾ inches across (2 oz.)

(CDC, 2019).

Check on Understanding:

1. What is maximum recommended amount of grams for carbohydrates?
    a) 5 grams per kilogram of body weight
    b) 8 g/kg
    c) 12 g/kg
    d) 15 g/kg
2. The two required sources of energy are _____ and proteins.
3. What's the most important nutritional requirement to meet?
4.

C6. Preventing & Recovering from Dehydration

The role of hydration is key to the human body's function, keeping the body balanced with fluids and the right chemical nutrients. The body in water balance is called **euhydration**. It is proven that if an athlete fails to maintain fluid needs, physical performance can be negatively affected, and the athlete may experience health issues. These hydration needs are usually in the forms of water and electrolytes. **Rehydration** is the process of absorbing fluids once a body is dehydrated. Unfortunately, it does not always replace all nutirents that were lost through the sweating process. **Hypohydration** is the uncompensated or unreplenished loss of body water. This can be dangerous because it can lead to dehydration and electrolyte imbalance, which can cause fatigue and hyperthermia (having a body temperature greatly above normal). **Hyperhydration,** also known as water intoxication or water poisoning, is defined by too much fluid ingestion. This may occur with excessive intake of water or sports drinks (Bagchi, 2019). **Table IV**

Table IV: American College of Sports Medicine guidelines on fluid and electrolyte replacement for physical activity[5,6]

Fluid and electrolyte recommendations for physical activity	
Before exercise	Pre-hydration should be initiated several hours before exercise to ensure fluid absorption and normal urine output. Beverages and sodium-containing and salted snacks can increase the sensation of thirst and retain fluids.
During exercise	Fluid programmes should be customised for each individual, based on body weight measurements before and after exercise. Athletes should aim to prevent > 2% body weight loss during exercise. Fluids should contain carbohydrates and electrolytes to maintain fluid balance and exercise performance..
After exercise	Normal meals and beverages will induce euhydration. If more rapid recovery is required, 1.5 l of fluid per kg body weight loss during exercise should be ingested. Beverages and snacks should contain sodium to help with rapid recovery, stimulation of thirst and fluid retention.

shows a chart of hydration for before, during and after exercise, but it also suggested that to prevent hypohydration (loss of body water) to ingest .5 to 2 liters per hour. During the recovery phase it is crucial to mix salt/sodium and water micronutrients to begin the replenishing phase of minerals and water to avoid dehydration (Potgieter, 2013).

Check on Understanding:

1. What is the difference between hypo- and hyper- hydration?
2. Define rehydration.
3. How many liter per hour is recommended to ingest?

C7. Weight Management

Weight management is commonly referred to as **diet**. To understand weight management as a whole there are terms that need to be defined. **Obesogenic** is simply an atmosphere that promotes increased food intake, lack of physical activity and intake of non-healthy foods. Obesity is an ongoing epidemic in today's youth and bleeds into adulthood nationwide, so weight management skills and tools are crucial in having a long and healthy life.

Developing good eating habits helps you to manage weight more proactively, through three levels:

- **individual level** choices like decreasing portions, eating low-calorie foods, and exercising regularly
- **community level** options selling low-calorie foods, eating locally grown fruits and veggies, and requesting more nutritious food from restaurants for their menus
- **national level** which is supported through the encouragement of increasing the walkability of cities, increasing campaigns against obesity and affordability of healthy foods

Dietary recommendations aim to change eating patterns: eating a variety of vegetables, fruits, grains, fat-free or low-fat milk products, lean meat and feasible amount of oils. We want to create healthy eating patterns that limit saturated fats, trans fats, added sugars, and sodium. A rule of thumb to manage weight better is to make sure to ingest less than 10 percent of calories per day from added sugars and saturated fats and to not exceed 2,300 milligrams per day (Titchenal, 2018).

Keep in mind that caloric intake vs calorie burn as the result of exercise is part of weight management. Ways to achieve a healthier weight are to increase physical activity, intensity, and frequency, and to vary the types of exercise. **Moderate activities** are generally the type where you can talk but not sing during exercise. **Vigorous activities** are where you can say a few words but are unable to do so without having to catch your breath. Overall exercise and proper healthy diets are what makes weight management easier. Also

ensure to follow any doctor or health related recommendations due to health concerns or biological needs, genetic concerns, and physiological abilities. Factors contributing to better weight management are energy balance, body weight and overall caloric output (Titchenal, 2018).

Check on Understanding:

1. _____ is also known as weight management
2. What are the three levels of proactive weight management?
3. I can talk but not sing, what type of activity/exercise is this?

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