ACTIVE NUTRITION GUIDE

A comprehensive nutrition resource for fueling and inspiring active lifestyles

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The Active Nutrition Guide supports health professionals in creating custom nutrition plans for active clients in four easy steps.

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For years, sports dietitians and professional organizations have developed nutrition recommendations focused on energy and fluid intakes, meal timing, and recovery strategies specifically for highly-trained, elite-level athletes. The science behind these recommendations is also valuable to all active people trying to feel their best at the activities they choose!

The Active Nutrition Guide aims to provide science-based information that enables health professionals to educate active individuals on the importance of nutrition in achieving their personal health and fitness goals. No one does the same amount of activity every day. This guide helps to personalize nutrition recommendations based on day-to-day intensity, frequency and duration of activity.

The recommendations and insights in this tool are intended for active individuals and have been crafted by experts, supported by science, and inspired by real-world experiences of active people.

LOOK FOR "SOPHIE"

FOR PRACTICAL APPLICATION GUIDANCE

See how the following recommendations specifically apply to Sophie's active lifestyle. For detailed calculations and meal plan information on Sophie and other case study examples, see page 18.

AGE: 25
HEIGHT: 5'2"
WEIGHT: 117 lbs

Training to run a sub 4-hour marathon.

Trains an average of 5-10 hrs/week.

ATHLETE NUTRITION INSIGHTS

88 ATHLETES SURVEYED

In a 2017 survey, 88 professional and semi-professional athletes participating in a variety of sports shared their **PERSONAL NUTRITION HABITS.***

Look for these insights throughout the guide.

*Athlete insights are derived from a 2017 survey of athletes sponsored by Clif Bar & Company. Athletes participated in a variety of sports including cycling, mountain biking, running, skiing, snowboarding, rock climbing, swimming and triathlon.

How Active is “Active”?

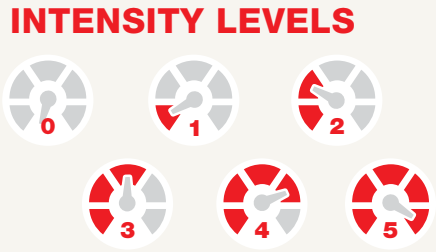
Aspiring to lead a more active lifestyle as a health and wellness goal is more prominent than ever. Activity has moved from being a weight-management tool to a mood and energy management strategy, as well as a social interaction activity. And consumers are aspiring to become more and more active. The Physical Activity Guidelines for Americans recommend that adults get at least 150 minutes (2½ hours) per week of moderate-intensity aerobic activity (i.e. walking), or 75 minutes (1¼ hour) per week of vigorous-intensity aerobic activity (i.e. jogging), or a combination of both. These guidelines also recommend that adults participate in muscle-strengthening activities (i.e. body weight activities or activities using weights or resistance bands) two or more days per week.[2]

While about 50% of U.S. adults are meeting the amount of aerobic activity recommended by the 2008 Physical Activity Guidelines for Americans,[1] a significant portion of Americans lead – or aspire to lead – an active lifestyle that exceeds this level. In fact, about one-third of U.S. adults engage in aerobic physical activity of at least moderate intensity for more than 300 minutes (5 hours) per week or more than 150 minutes (2½ hours) per week of vigorous intensity – or a combination of both.[3] Furthermore, the intensity level and duration at which these individuals exercise can vary widely day to day.

STEP 1

Identify Activity Intensity Level

Active individuals, as defined in this guide, are adults (18 years or older) whose lifestyle and day-to-day activity ranges from an intensity level of 1-5 at a duration between 20-240 minutes. While health professionals encourage this active lifestyle, nutrition guidelines tailored to helping active people eat in a way that best supports activity are lacking.



SOPHIE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
	2	4	2	4	2	4	0
Activity Schedule	**Walk** 30 min @ 15 min/mile pace	**Run** 1 hr @ 9 min/mi pace	**Walk** 30 min @ 15 min/mile pace	**Run** 1 hr @ 9 min/mi pace	**Walk** 30 min @ 15 min/mile pace	**Run** 2 hr @ 9 min/mi pace	**Rest**

With Sophie's varied training schedule and resulting energy demands, she will adjust her food intake to match her day-to-day activity.

The Dietary Guidelines for Americans (DGA) provide evidence-based food and beverage recommendations that aim to promote health, prevent chronic disease, and help Americans reach and maintain a healthy weight. The DGA are foundational recommendations that serve as a baseline entry point for maintaining health.[4]

Most nutrition recommendations for active individuals aim to promote short-term change (e.g., acute recovery after exercise). However, the integration of training and nutritional practices with long-term goals in mind can positively impact performance in both training and competition. When compared to self-chosen nutrition regimens, research shows that applying scientifically-based nutrition strategies improves exercise performance.[5]

Non-elite runners completed a marathon 4.7% faster by applying a scientifically-based nutritional strategy when compared to a freely chosen one.[6]

People who lead or aspire to lead active lifestyles benefit from a meal plan that takes into account day-to-day intensity, frequency and duration of activity. An active individual's intensity and duration of activity can vary widely across weeks, months and years. It is also important to consider the variation in activity experienced day to day (i.e., rest day, light activity day, heavy activity day, competition or race day) and the goals of the individual. As such, this guide emphasizes periodization (both day to day and within each day) to help active individuals fuel their bodies in a way that helps them achieve their daily activity goals associated with each day.

While this Active Nutrition Guide is inclusive of some of the recommendations found in the DGA[4] and the Physical Activity Guidelines for Americans[2] (both for the general population) as well as the Nutrition and Athlete Performance position paper by the Academy of Nutrition and Dietetics (AND), Dietitians of Canada (DC), and the American College of Sports Medicine (ACSM)[7] (for serious athletes), it is intended to complement these resources by providing periodized nutrition guidance to individuals whose day-to-day activity level may lie somewhere between the DGA and the AND/DC/ACSM recommendations and to ultimately inspire more active lifestyles.

Table 1, on the next page, provides an overview of the five intensity levels an individual might experience in their day-to-day activity.

Table 1: Activity level classification and examples

INTENSITY LEVEL	TYPE OF ACTIVITY
5 (>75% HR Max*)	**Run** at a 6-7.9 min/mi or 3.5-4.9 min/km pace **Bike** 21-26 mi/hr or 33-42 km/hr **Swim** <2:00 min/100 m
4 (65-75% HR Max*)	**Run** at an 8-9.9 min/mi or 5-6.1 min/km pace **Bike** 15-20 mi/hr or 23-32 km/hr **Swim** 2:00-2:45 min/100 m SOPHIE Tues, Thur and Sat
3 (55-65% HR Max*)	**Jog** at a 10-11.9 min/mi pace or 6.2-7.5 min/km **Bike** 11-14 mi/hr or 18-23 km/hr **Swim** 2:44-3:15 min/100 m
2 (45-55% HR Max*)	**Walk** at 12-14.9 min/mi or 7.6-9.3 min/km **Bike** 8-10 or 13-16 km/hr **Swim** 3:16-3:39 min/100 m SOPHIE Mon, Wed and Fri
1 (<45% HR Max*)	**Walk** at a 15-20 min/mi or 9.4-12 min/km pace **Bike** <8 mi/hr or 13 km/hr **Swim** >3:39 min/100 m
0	Physical Activities of Independent Living; Rest Day SOPHIE Sun

*HR Max = [208 - (age in yrs x 0.7)][8]

ACTIVITY LEVELS

Building a Strong Foundation

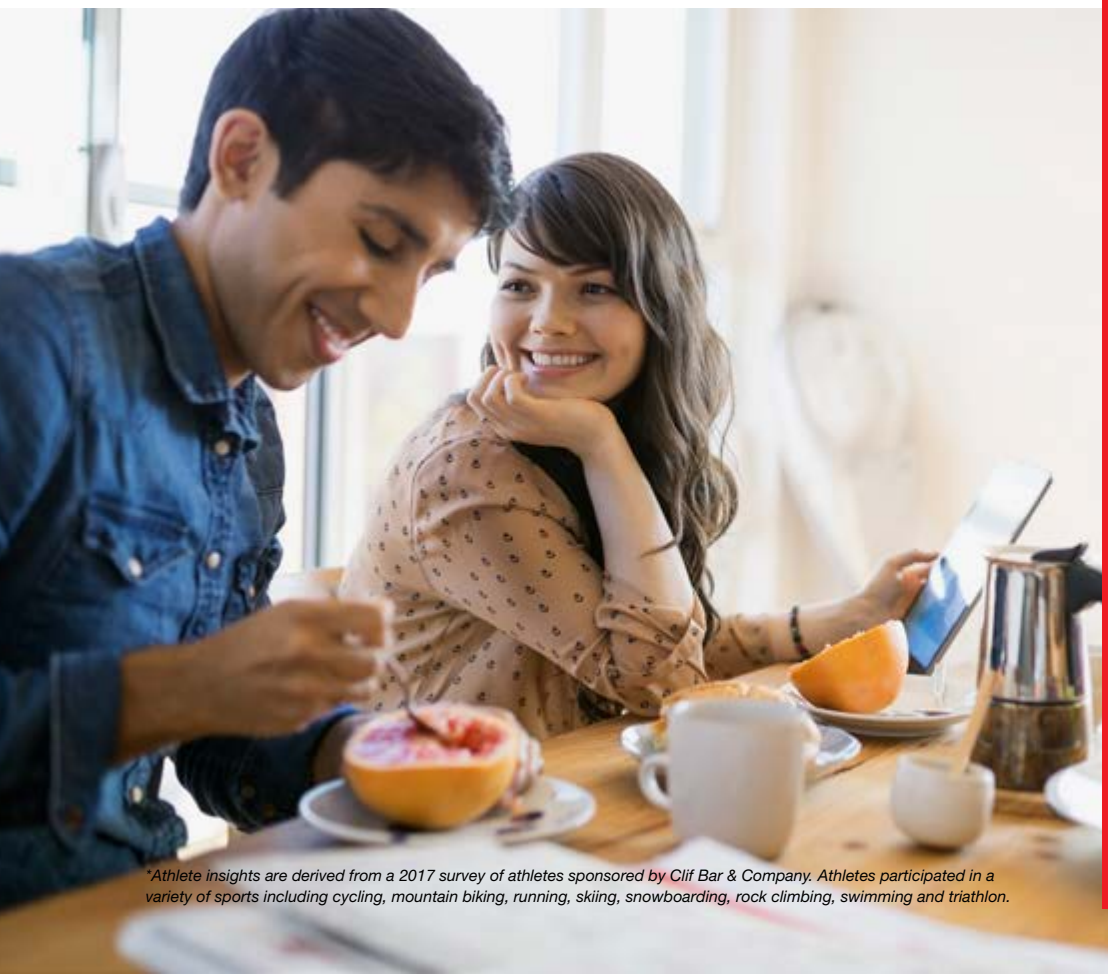
The Importance of Nutrition to Fuel Activity

Food is our body's fuel, so it should come as no surprise that paying attention and implementing a nutrition plan leads to better performance and can help active individuals of all ages and abilities achieve their activity goals. Although some may believe they can "out-exercise" a bad diet, the evidence suggests otherwise.

Active individuals need to eat with purpose and implement a sound nutrition plan year-round to maintain health and maximize activity outcomes to accomplish what they set out to do.

Building a strong nutrition foundation through implementing daily fueling strategies can help active individuals stay healthy and prevent injuries while maximizing the effects of their activity and helping achieve performance goals.

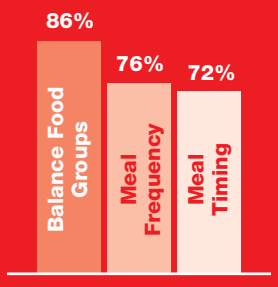
The primary focus of the DGA is prevention of disease and overall health for all Americans.[4] The DGA provides a solid foundation for an overall healthy dietary pattern, so active individuals should be encouraged to follow them as a starting point. However, the DGA do not provide specific guidance and personalized plans for the more active individuals whose active lifestyle requires more guidance on what, when and how much to eat for improved physical activity outcomes. Active individuals require nutrition recommendations that focus on more than just preventing nutritional deficiencies; they need recommendations that consider activity/sport, intensity, duration and frequency of physical effort. Such nutrition recommendations need to be personalized to the individual to account for their fitness goals, activity regimen, practical challenges, food preferences and responses to various strategies.



ATHLETE NUTRITION INSIGHTS

of athletes believe that **DIET AND NUTRITION** are important for optimal performance*

Athletes identified the most important **NUTRITION FACTORS** for performance as:



Athlete insights are derived from a 2017 survey of athletes sponsored by Clif Bar & Company. Athletes participated in a variety of sports including cycling, mountain biking, running, skiing, snowboarding, rock climbing, swimming and triathlon.

This guide provides nutrition professionals with evidence-based guidelines and the tools needed to customize nutrition plans and dietary patterns for active individuals who regularly participate – or are aspiring to participate more often – in moderate-to-vigorous fitness activity or sports. Nutritional needs vary day to day based on the type and amount of activity – rest day, light activity day, heavy activity day, competition or race day.

To help active individuals modify their energy and nutrient intakes per the demands of activity and their individual goals, this guide applies the concept of periodization by categorizing the degree of physical effort into five levels. This allows active individuals to adjust their daily energy, nutrients, and food intake patterns to support their changing levels of physical activity.

Overall, active individuals have higher needs for certain nutrients, particularly carbohydrate and protein, and can optimize energy levels and success in meeting performance goals through careful considerations of food sources and the timing of intake.

ATHLETE NUTRITION INSIGHTS

56%

said **FINE-TUNING** a daily **EATING PATTERN** is the most important nutrition consideration for athletic performance*

Who do athletes rely on for **NUTRITION GUIDANCE?**

53%

said advice from a **HEALTH PROFESSIONAL**

(dietitian or other member of the athletic care team)

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Energy

Appropriate energy (calorie) intake is the cornerstone of the active individual's diet because it supports overall health and optimal body function, determines the capacity for intake of macronutrients and micronutrients, and assists in manipulating body composition.

Energy requirements are generally higher in active individuals, depending on activity routine, and will vary from day to day throughout the year relative to changes in activity frequency and intensity.

ESTIMATED SAMPLE ENERGY NEEDS PER DAY (KCAL/D)

Rest Day	Levels 1-5 Activity Days	Endurance Event
1,600-2,000	2,000-3,600	3,600-5,000

Q & A

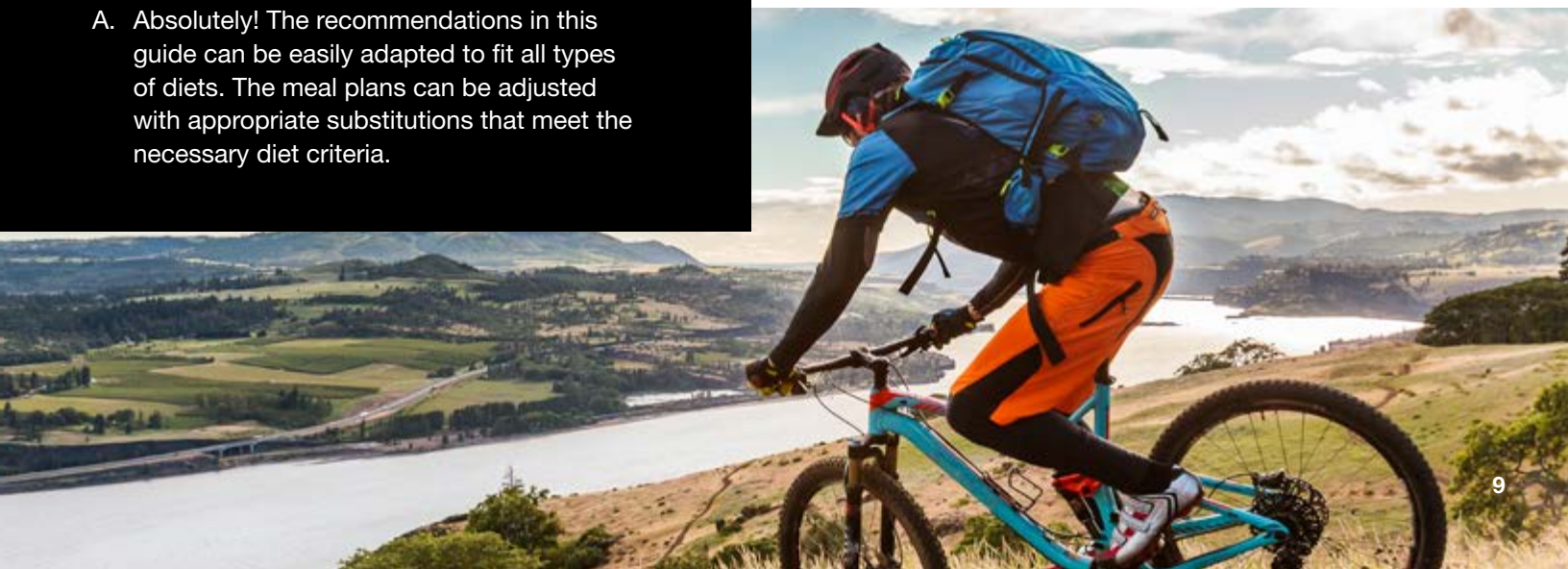
Q. Can the Active Nutrition Guide be used with active individuals who follow a specialty diet (i.e., vegetarian, vegan, gluten-free, organic, etc.)?

A. Absolutely! The recommendations in this guide can be easily adapted to fit all types of diets. The meal plans can be adjusted with appropriate substitutions that meet the necessary diet criteria.

Other factors that can increase energy needs above normal baseline levels for active individuals include exposure to cold or heat, stress, high altitude exposure, specific drugs, (e.g., caffeine and nicotine, medications and increases in fat-free mass (FFM)).

Routine activity performed at a high intensity and active nutrition that properly supports this level of activity bring about metabolic adaptations that can improve both health and performance. Metabolic adaptation refers to changes in the way the body – particularly muscle cells – produce and use energy, build new proteins, and repair damaged tissues. Diet, physical activity, and changes in body weight and body composition can influence metabolism. The nutrient composition of the diet, meal and nutrient timing, and the type and duration of activity can cause a cascade of events that lead to metabolic adaptations. For instance, a high-carbohydrate, low-fat diet (HCLF) will increase the oxidation of carbohydrate during activity whereas a high fat low-carbohydrate, high-fat (LCHF) diet slightly increases fat oxidation during activity, but impedes performance. Rapid weight loss can reduce metabolic rate whereas a decrease in body fat and an increase in lean mass (muscle) can raise metabolic rate. Meal and nutrient timing can also trigger changes that can help preserve or increase lean mass or help increase satiety.

Energy availability – the amount of energy remaining after the calories of activity have been subtracted from the calories consumed – sets an important foundation for the success of active nutrition strategies. It is important to consume adequate calories relative to activity needs to maintain health and maximize performance outcomes.



Carbohydrates

Carbohydrates are important for everyone, but even more crucial in the diet of active individuals. There are four primary reasons for this. First, body stores of carbohydrates (glycogen in liver and muscles) are limited and can be acutely altered by dietary intake and activity. Second, carbohydrate is a critical fuel for the brain and nervous system and the preferred substrate for working muscles. Third, carbohydrate oxidation requires less oxygen than other fuel sources (fatty acids and amino acids). In other words, it is more economical (lower oxygen cost) for muscles to oxidize carbohydrates. Fourth, there is compelling evidence that maintaining high carbohydrate availability during prolonged as well as intermittent, high-intensity activity enhances exercise capacity;[7] depletion of the body's carbohydrate stores is associated with fatigue, increased perception of effort, reduced work rates, and impaired skill and performance.

Active individuals should aim to consume 50-65 percent of their total daily energy intake as carbohydrates. Carbohydrate intake should be customized to meet the fuel demands of the day's activities, along with the active individual's overall calorie requirements and goals.

Recommended carbohydrate sources to fuel activity include fruits, vegetables, whole grains, dairy products, beans and legumes, and sports nutrition products, as appropriate.

ATHLETE NUTRITION INSIGHTS

Athletes believe that the

#1 nutrition strategy

to improve athletic performance is to eat higher-quality carbohydrates*

Carbohydrates most frequently consumed on **TRAINING DAYS**:

- **Bananas**
- **Berries**
- **Apples**
- **Sweet potatoes**

Carbohydrates most frequently consumed before an **EVENT**:

- **Fruit**
- **Oats**
- **Energy/protein bars**
- **Electrolyte drinks**

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Targeted carbohydrate fueling practices are important for supporting high-quality workouts. Individual recommendations for daily intakes of carbohydrates should take an active individual's fitness goals into consideration and be customized based on their size, sport, volume and intensity of activity. The timing of carbohydrate feeding throughout the day, and in relation to an active occasion, can be adjusted to promote or reduce its availability. Nutrient timing allows carbohydrates to be available when they are most needed to support muscle demands, with lesser amounts provided when demand is low.

Q & A

Q. What is the role of added sugar in active nutrition?

A. Sugar is one of several sources of carbohydrates that deliver immediate energy to the body to help active moving muscles and the brain. For active individuals, sugar can be used for quick absorption/ immediate energy or combined with protein and fat to slow the absorption of sugar and provide sustained energy for long-term activity.

ATHLETE NUTRITION INSIGHTS

Important **NUTRITION FACTORS** for athletic performance*:

72% **Meal Timing**

75% **Meal Frequency**

Table 2. Added sugar allowances based on energy needs

Energy (kcal/day)	1,600	2,000	2,400	2,800	3,200	3,600
	As calories increase added sugar allowances increase.					
Added Sugar Allowances (g/day)	40 g (10 tsp)	50 g (12.5 tsp)	60 g (15 tsp)	70 g (17.5 tsp)	80g (20 tsp)	90 g (22.5 tsp)
	2 1-oz squares chocolate + 1 energy bar	3 1-oz squares chocolate + 1 energy bar	4 1-oz squares chocolate + 1 energy bar	12-oz sports drink + 1 energy bar + 2 1-oz squares chocolate	12-oz sports drink + 2 energy bars + 2 1-oz squares chocolate	2 12-oz sports drinks + 2 energy bars + 1 1-oz square chocolate

Based on Estimated Energy Requirements (EER) equations, using reference heights (average) and reference weights (healthy) for each age-gender group. For children and adolescents, reference height and weight vary. For adults, the reference man is 5 feet 10 inches tall and weights 154 pounds. The reference woman is 5 feet 4 inches tall and weights 126 pounds. EER equations are from the Institute of Medicine, Dietary Reference intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids. Washington (DC): The National Acedemies press: 2001. Added Sugar Allowances based on 2015-2020 Dietary Guidelines for Americans recommendation to consume less than 10 percent of calories per day from added sugars.

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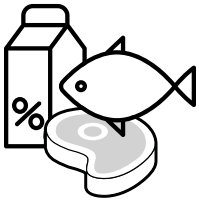
Protein



Intense or prolonged activity causes an increase in muscle protein breakdown, which is followed by an increase in muscle protein synthesis over the next 24 hours. The consumption of high-quality protein during this period enhances this process – accelerating the recovery process and stimulating skeletal muscle growth.

Active individuals have higher protein needs than sedentary individuals. Protein helps repair and strengthen muscle tissue, so proteins are particularly important for individuals involved in both endurance and strength activities. Active individuals should aim to consume 10-20 percent of their total daily energy intake as protein.

While many active individuals meet or exceed the recommendations for daily protein intake,[9] they may not be distributing their protein intake evenly throughout each day, missing an opportunity to optimize muscle protein synthesis and support the metabolic adaptations to training. To maximize the response to each exercise bout, an active individual should consider not only the amount of protein consumed throughout the day, but also the timing of intake.

ATHLETE NUTRITION INSIGHTS

Believe they can improve their athletic performance by **CHANGING THEIR CURRENT DIET.***

Cited **DISTRIBUTION OF MACRONUTRIENTS** as an important factor for athletic performance*

Protein sources most frequently consumed **DURING TRAINING DAYS**:

- **Eggs**
- **Animal protein**
- **Nut butters**

Protein sources most frequently consumed **AFTER AN EVENT**:

- **Protein drinks**
- **Energy/protein bars**

The athlete's size and age should be factored into these recommendations, as well as their energy budget and other nutritional considerations. For example, small athletes might need only 15-20 g of protein on an eating occasion to maximize performance benefits, while a larger athlete with high energy requirements can easily incorporate 40 g of protein at a meal. Older athletes (e.g., > 55-60 yrs) may need to consume more protein to get the same effect as a younger athlete due to the progressive loss of muscle mass associated with the aging process.[10,11]

Q & A

Q. Are proteins from animal or plant sources better for active individuals?

A. Animal- and plant-based protein sources may differ in their amino acid profiles. Animal proteins are considered complete proteins because they contain all nine of the essential amino acids necessary for protein synthesis. Most plant-based proteins are considered incomplete proteins and may not contain one or two essential amino acids. Both types will meet overall protein needs, so it's recommended to consume a variety of sources to optimize protein synthesis, particularly for those choosing more or all plant-based options.[12]

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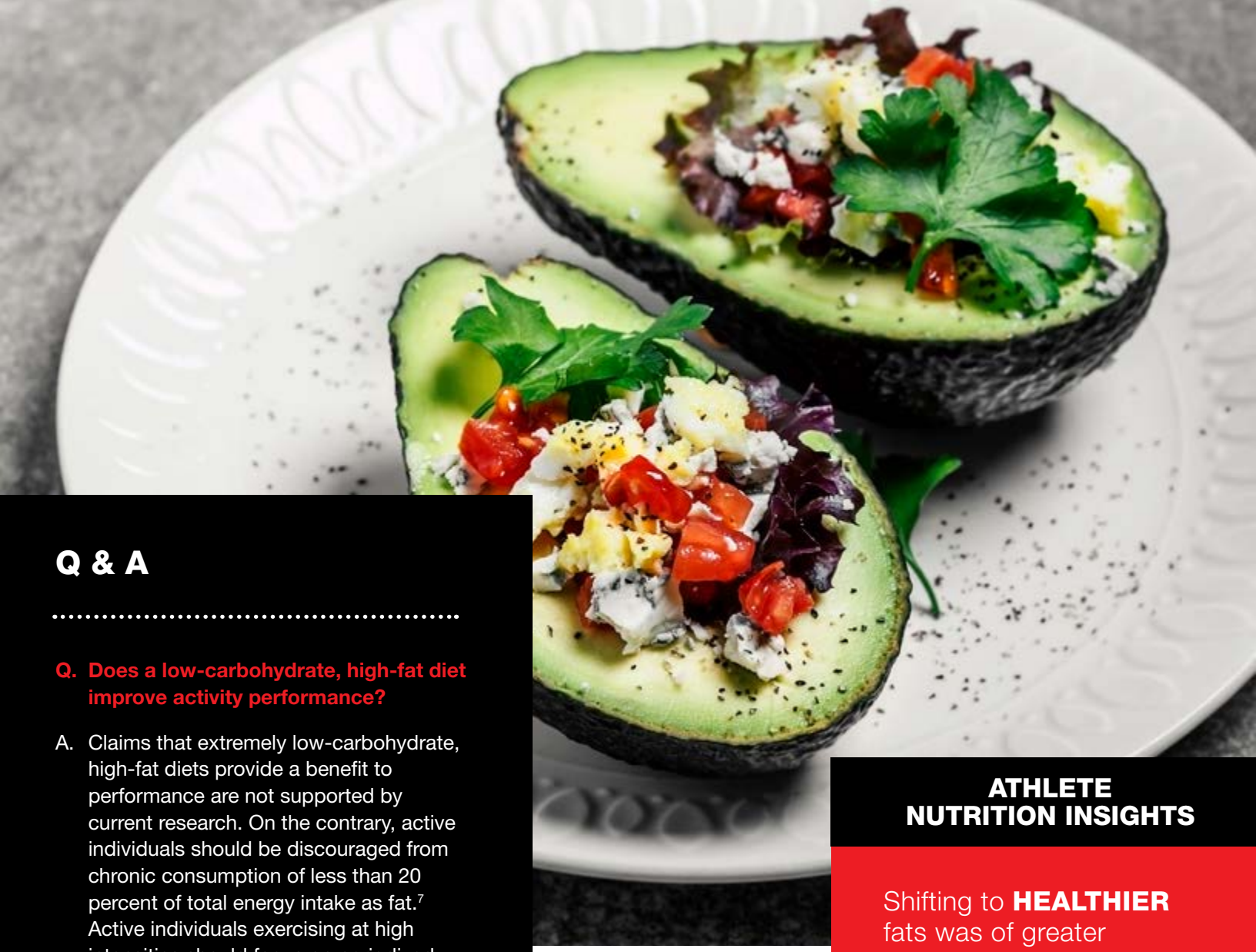


Q & A

Q. Does a low-carbohydrate, high-fat diet improve activity performance?

A. Claims that extremely low-carbohydrate, high-fat diets provide a benefit to performance are not supported by current research. On the contrary, active individuals should be discouraged from chronic consumption of less than 20 percent of total energy intake as fat.[7] Active individuals exercising at high intensities should focus on periodized nutrition, rather than restriction.

Fat

Fat is a necessary part of a balanced diet as it supplies energy and helps improve the absorption of fat-soluble vitamins. Recommended fat intake for active individuals should follow the general DGA recommendation of 20-35 percent of total daily energy intake, and be individualized based on activity level and body composition goals.[4] Just like the general population, active individuals should focus on the type of fat consumed, choosing unsaturated sources like non-tropical vegetable oils, nuts and nut butters, and avocado, while limiting saturated fat into intake to no more than 10 percent of energy intake.

ATHLETE NUTRITION INSIGHTS

Shifting to **HEALTHIER** fats was of greater interest than increasing or decreasing the **AMOUNT** of fat in the diet.*

Most common sources of **FAT** consumed on training days:

- **Avocado**
- **Nuts**
- **Nut Butters**

**Athlete insights are derived from a 2017 survey of athletes sponsored by Clif Bar & Company. Athletes participated in a variety of sports including cycling, mountain biking, running, skiing, snowboarding, rock climbing, swimming and triathlon.*

STEP 2

Estimate Foundational Diet Needs

Foundational Diet

Energy needs for active individuals will vary substantially based on individual characteristics (e.g., body weight and fat-free mass), performance goals, frequency and intensity of activity.

The following **Foundational Diet** – rooted in the DGA guidelines for active people – outlines baseline nutrition recommendations for an active individual. The following section will discuss how to build upon this Foundational Diet with appropriate nutrition recommendations for various activity days.

DETERMINING THE FOUNDATIONAL DIET TOTAL DAILY ENERGY EXPENDITURE (TDEE)

TDEE refers to the energy expenditure needed without planned/purposeful exercise.[13,14]

TDEE = Resting Metabolic Rate (RMR)* x Physical Activity Level (PAL)**

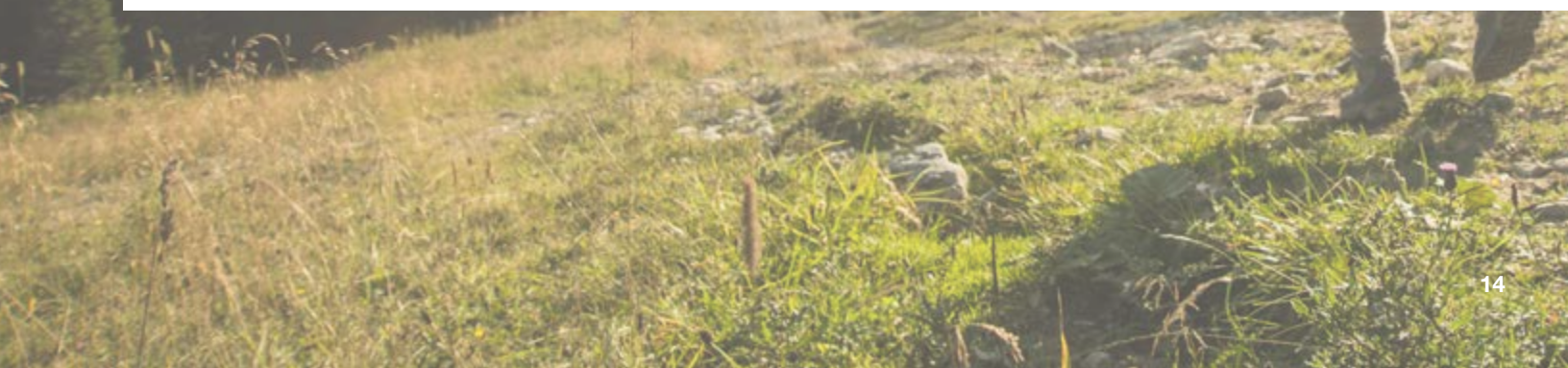
SOPHIE'S TDEE = 1,230 (RMR)* x 1.5 (PAL) = 1,845 kcal/day

*RMR for Males (kcal/day) = (9.99 x weight in kg) + (6.25 x height in cm) - (4.92 x age in yrs) + 5
RMR for Females (kcal/day) = (9.99 x weight in kg) + (6.25 x height in cm) - (4.92 x age in yrs) - 161

**Use the following table to determine your client's PAL factor

Table 3: PAL factors and corresponding daily activities for active individuals

ACTIVITY FACTOR (PAL)		DAILY ACTIVITIES
MALE	FEMALE	
1.6	1.5	Office Work (e.g., sitting, walking, standing)
1.7	1.6	Light Manual Labor (i.e., occupations where you are mostly on your feet e.g., restaurant, retail, healthcare)
1.8	1.7	Moderate to Heavy Manual Labor (i.e., occupations where you are always on your feet and lifting/moving significant weight (e.g., warehouse, construction, agriculture))



Using the previously calculated TDEE, use the next table to calculate your client's Foundational Diet macronutrient breakdown (the diet he/she will follow on Rest, Level 1 and Level 2 activity days).

Table 4: Foundational Diet carbohydrate, protein and fat recommendations

	CARBOHYDRATE	PROTEIN	FAT
Amount	50-65% of total daily energy intake 2.3-4.0 g/lb (5-9 g/kg) of body weight	10-20% of total daily energy intake 0.5-0.9 g/lb (1.2 g-2.0 g/kg) of body weight; 20-30 g/meal	20-35% of total daily energy intake 50-100 g per day Balance of energy needs once carbohydrate and protein needs are met
Recommended Sources and Servings*	Fruits (4-7 per day) Vegetables (5-9 per day) Grains, especially whole grains such as whole wheat bread, pasta, oatmeal, brown rice, quinoa and other ancient grains (8-12 per day)	Lean meat, fish and poultry or soy foods (tofu, tempeh) (2-4 per day) Eggs Dairy products, including milk, yogurt and cheese (2-3 per day) Legumes (4-5 per wk)	Low saturated fat oils, such as olive, canola, and avocado (2-5 per day) Avocado Nuts, seeds and nut butters (4-5 per wk)
Sophie's Foundational Diet SOPHIE Mon, Wed, Fri and Sun	5.2g/kg → 276 g Fruit – 4 servings Vegetables – 6 servings Grains/Starch – 8 servings	1.25 g/kg → 66 g Legumes/Beans – 2 servings Dairy – 3 servings	53 g Oil/Avocado/Nuts/ Seeds – 8 servings
See the Math	1,845 kcal x 0.60 = 1,107 kcal CHO 1,107 kcal CHO ÷ 4 kcal/g CHO = 276 g CHO 276 g CHO = • Fruit = 4 servings • Vegetables = 6 servings • Grain/Starch = 8 servings	1,845 kcal x 0.145 = 267 kcal PRO 264 kcal PRO ÷ 4 kcal/g PRO = 66 g PRO 66g PRO = • Legumes/Beans = 2 servings • Dairy = 3 servings	1,845 kcal x 0.26 = 480 kcal FAT 480 kcal FAT ÷ 9 kcal g FAT = 53 g FAT 53 g FAT = • Oils/Nuts/Seeds/Other = 8 servings

*Estimated serving size recommendations based on a 2,000-calorie diet. Serving sizes based on the American Dietetics Association and The American Dietetic Association Diabetic Exchange List.[15]

Tailoring Nutrition Plans

Using Nutrition Periodization

Active individuals should to consider specific nutrition needs on a day-to-day basis depending on their goals and the intensity and duration of their activity. In one single week, an individual's workouts can range from long, high-intensity activity days to short, low-intensity activity days. The basic Foundational Diet can meet the nutrition needs on low-activity days, but a custom periodized nutrition plan is recommended for high-activity days.

Periodized nutrition is planned, purposeful eating in which intake may change from day to day – or be organized in various ways over the course of a single day – to reflect the changing needs and goals of an active individual.[16]

For example, nutrition can be periodized to support muscle gain during a certain period of a season, energy intake can be increased/ decreased daily depending on a training schedule, or carbohydrates can be distributed in various ways throughout a single day to affect performance at a specific moment in time.

Daily carbohydrate, fat and protein needs will vary depending on the active individuals goals, and on that day's activity type, intensity and duration. For example, during certain times of year, an active individual may focus on weight management and lower energy intake, versus other periods where there may be a focus on performance and higher carbohydrate intake. Nutrition periodization enables adaptations to support changing individual goals, intensity levels and demands throughout a season, training cycle or activity routine.

The following section provides an overview of active individuals' nutrition needs based on their activity duration at the previously determined intensity levels (i.e., Levels 3-5; the Foundational Diet can be used to fuel Levels 1 and 2). All levels consider endurance activity and assume a low to moderate level of strength and conditioning activity. Nutrition recommendations are for weight maintenance, but can be adjusted for individuals seeking to lose or gain additional weight.

There are many ways to estimate energy expended from activity. Certain activities are easier to estimate energy expended per minute than others. For example, energy expenditure for running is approximately 1 kcal/kg/km (0.73 kcal/lbs/mile). Wearable technology (such as heart rate monitors) can support active lifestyles by making the estimation of energy expenditure during activity easy.

STEP 3

Determine Daily Nutrition Needs for Activity Duration

Note that the following recommendations are intended for weight maintenance. Additional adjustments are needed for clients looking to lose or gain weight.

INTENSITY

Table 5: Daily nutrition recommendations for activity based on intensity and total time of daily activity:

	3	4	5
60-90 MINUTES OF ACTIVITY			
Energy	TDEE + 0.12-0.15 kcal/kg/min	TDEE + 0.15-0.21 kcal/kg/min	TDEE + >0.22 kcal/kg/min
Carbohydrate	5-6 g/kg/d	5.5-7 g/kg/d + • 1-2 g/kg 1-4 hr pre-activity • 15-30 g/hr during activity	6.5-8 g/kg/d + • 1-2 g/kg 1-4 hr pre-activity • 15-30 g/hr during activity
Protein	1.2-2.0 g/kg/d + 0.25 g/kg, (15-25 g) 0-2 hrs post-activity		
Fat	20-35% Adjusted Calories		
90-120 MIN/DAY			
Calories	TDEE + 0.12-0.15 kcal/kg/min	TDEE + 0.15-0.21 kcal/kg/min	TDEE + >0.22 kcal/kg/min
Carbohydrate	5-7 g/kg/d + • 1-2 g/kg 1-4 hr pre-activity • 15-30 g/hr during activity	6-8 g/kg/d + • 1-2 g/kg 1-4 hr pre-activity • 30-60 g/hr during activity	7-9 g/kg/d + • 1-2 g/kg 1-4 hr pre-activity • 30-60 g/hr during activity
Protein	1.2-2.0 g/kg/d) + 0.275 g/kg, (15-25 g) 0-2 hr post-activity		
Fat	20-35% Adjusted Calories		
120-240+ MIN/DAY			
Energy	TDEE + 0.12-0.15 kcal/kg/min	TDEE + 0.15-0.21 kcal/kg/min	TDEE + >0.22 kcal/kg/min
Carbohydrate	6-8 g/kg/d + • 1-3 g/kg 1-4 hr pre-activity • Up to 30-45 g/hr during activity	7-9 g/kg/d + • 1-3 g/kg 1-4 hr pre-activity • Up to 40-65 g/hr during activity	8-10 g/kg/d + • 1-3 g/kg 1-4 hr pre-activity • 60-90 g/hr during activity
Protein	1.2-2.0 g/kg/d + 0.3 g/kg, (15-25g) 0-2 hr post-activity		
Fat	20-35% Adjusted Calories		

SOPHIE Tues and Thurs

SOPHIE Sat

TIME

STEP 4

Customize Meal Patterns

Performance Meal Patterns

The following examples showcase how the above nutrition recommendations translate into real-life meal patterns for performance across various activity scenarios in four different popular sports – running, triathalon, mountain biking and cycling. These examples can serve as a benchmark when creating individual meal patterns.

SOPHIE

Sophie is a 25-year-old petite female runner. At 5'2" (157.5 cm), she weighs 117 lbs (53 kg). She works a full-time office job that requires limited physical activity. She is training to run a sub 4-hour marathon and currently trains an average of 5-10 hours/ week. She is also a lacto-ovo vegetarian.

TDEE: 1,845 kcal

Carbohydrate: 5.2 g/kg = 276 g
Protein: 1.25 g/kg = 66 g
Fat: 26% total kca = 53 g

Activity Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
2	4	2	4	2	4	0
Walk 30 min @ 15 min/mi pace	**Run** 60 min @ 9 min/mi pace	**Walk** 30 min @ 15 min/mi pace	**Run** 60 min @ 9 min/mi pace	**Walk** 30 min @ 15 min/mi pace	**Run** 120 min @ 9 min/mi pace	**Rest**

SOPHIE'S DAILY NUTRITION RECOMMENDATIONS

Table 6. Sophie's daily nutrition recommendations

	RECOMMENDATIONS	SOPHIE'S NUTRITION NEEDS	ADDITIONAL FUEL*
30-60 MIN/DAY (30-MIN RUN)			
No change needed from Foundational Diet			
	RECOMMENDATIONS	**SOPHIE'S NUTRITION NEEDS**	**ADDITIONAL FUEL***
60-90 MIN/DAY (60-MIN RUN)			
Calories	TDEE + (0.15-0.21 kcal/kg/min)	2,322 kcal/d	
Carbohydrate	5.5-7 g/kg/d + • 1-2 g/kg 1-4 hr pre-activity • 15-30 g/hr during activity	5.8 g x 53 kg = 307 g/d + • 60 g 1-4 hr pre-activity • 15 g/hr during activity Total carbohydrate = 382 g	Pre-Activity Snack: Smoothie: • 1 banana • 1 cup frozen berries • 1 cup orange juice During Activity Fuel: • 8 oz. sports drink
Protein	1.2-2.0 g/kg/d + • 0.25 g/kg, (15-25 g) 0-2 hr post-activity	1.25 g x 53 kg = 66 g/d + • 13.25 g 0-2 hr post-activity Total protein = 79.25 g	Post-Activity Recovery Snack: Vanilla Chia Pudding: • ½ cup milk • 2 Tbsp. chia seed • ½ tsp. vanilla extract • 1 Tbsp. maple syrup • ¼ cup low-fat granola • ½ cup berries
Fat	20-35% Adjusted Calories	26% Adjusted Calories • 53 g	

*Additional fuel does not include water consumed during activity.

SOPHIE'S DAILY NUTRITION RECOMMENDATIONS

Table 6. Continued

	RECOMMENDATIONS	SOPHIE'S NUTRITION NEEDS	ADDITIONAL FUEL*
120-240+ MIN/DAY (120-MIN RUN)			
Calories	TDEE diet + (0.15 x 53 kg) kcal/min	2,799 kcal/d	
Carbohydrate	7-9 g/kg/d + • 1-3 g/kg 1-4 hr pre-activity • Up to 40-65 g/hr during activity	7 g x 53 kg = 371 g/d + • 60 g 1-4 hr pre-activity • 43 g/h during activity (i.e., consumed 1 hr into workout) Total carbohydrate = 474 g	Pre-Activity Snack: Smoothie: • 1 banana • 1 cup frozen berries • 1 cup orange juice During Activity Fuel: • 24 oz. sports drink
Protein	1.2-2.0 g/kg/d + • 0.3 g/kg, (15-25 g) 0-2 hr post-activity	1.7 g x 53 kg = 90 g/d + • 16 g 0-2 hr post-activity Total protein = 106 g	Post-Activity Recovery Snack: Vanilla Chia Pudding: • ½ cup milk • 2 Tbsp. chia seed • ½ tsp. vanilla extract • 1 Tbsp. maple syrup • ¼ cup low-fat granola • ½ cup berries
Fat	20-35% Adjusted Calories	26% Adjusted Calories • 53 g	

*Additional fuel does not include water consumed during activity.

SOPHIE Meal Plan

Sun (0) · Mon, Wed and Fri (2)

Foundational Diet
(Rest and 30-min walk)

BREAKFAST

Quinoa with banana and pistachios

Berry, yogurt and granola parfait

LUNCH

Butternut squash soup

Cherries

Smashed chickpea sandwich with avocado

AFTERNOON SNACK

Cereal, fruit and nut mix

DINNER

Glass of milk

Asian carrot and cucumber salad

Veggie and edamame peanut noodle stir fry

+ Tues and Thurs (4)

Level 4 (60-min run) Activity Day

PRE-ACTIVITY

Smoothie

DURING ACTIVITY

Sports drink

POST-ACTIVITY

Chia pudding

+ Sat (4)

Level 4 (120-min run) Activity Day

MORNING SNACK

Cottage cheese with fruit

PRE-ACTIVITY

Smoothie

DURING ACTIVITY

Sports drink

POST-ACTIVITY

Chia pudding

Meal Plan

Foundational Diet

(Rest and 30-min walk)

0 Sun

2 Mon, Wed and Fri

BREAKFAST

½ cup cooked quinoa
4 oz. skim milk
¼ cup pistachio
½ banana
Yogurt Parfait
- 8 oz. low-fat vanilla Greek yogurt
- 1 cup strawberries
- ¼ cup low-fat granola

LUNCH

1 cup butternut squash soup
Smashed chickpea salad sandwich
- ½ cup chickpea mixture: chickpeas, carrot, red onion, dill pickles, mustard, garlic powder, dill, turmeric, black pepper
- Fresh baby spinach or watercress

⅛ avocado
2 slices whole grain bread
2 cups fresh cherries

AFTERNOON SNACK

Cereal, fruit & nut mix
- 1 cup whole grain cereal
- ¼ cup raisins
- 1 oz. (22 kernels) dry-roasted, salted almonds

DINNER

Veggie and edamame peanut noodle stir fry
- 1 cup whole wheat or soba noodles
- 2 cups veggies: broccoli, mushrooms, carrots, bell peppers, scallions, edamame

1½ cups Asian carrot and cucumber salad
- Carrots, cucumbers, pear, cabbage
- 2 tsp. honey vinegar dressing

1 cup skim milk

Level 4 (60-min run) Activity Day

4 Tues and Thurs

BREAKFAST

½ cup cooked quinoa
4 oz. skim milk
¼ cup pistachio
½ banana
Yogurt Parfait
- 8 oz. low-fat vanilla Greek yogurt
- 1 cup strawberries
- ¼ cup low-fat granola

LUNCH

1 cup butternut squash soup
Smashed chickpea salad sandwich
- ½ cup chickpea mixture: chickpeas, carrot, red onion, dill pickles, mustard, garlic powder, dill, turmeric, black pepper
- Fresh baby spinach or watercress

⅛ avocado
2 slices whole grain bread
2 cups fresh cherries

AFTERNOON SNACK

Cereal, fruit & nut mix
- 1 cup whole grain cereal
- ¼ cup raisins
- 1 oz. (22 kernels) dry-roasted, salted almonds

DINNER

Veggie and edamame peanut noodle stir fry
- 1 cup whole wheat or soba noodles
- 2 cups veggies: broccoli, mushrooms, carrots, bell peppers, scallions, edamame

1½ cups Asian carrot and cucumber salad
- Carrots, cucumbers, pear, cabbage
- 2 tsp. honey vinegar dressing

1 cup skim milk

PRE-ACTIVITY SNACK

Smoothie
- 1 banana
- 1 cup frozen berries
- 1 cup orange juice

DURING ACTIVITY

8 oz. sports drink

POST-ACTIVITY SNACK

Vanilla Chia Pudding
- ½ cup milk
- 2 Tbsp. chia seed
- ½ tsp. vanilla extract
- 1 Tbsp. maple syrup
- ¼ cup low-fat granola
- ½ cup berries

Level 4 (120-min run) Activity Day

4 Sat

BREAKFAST

½ cup cooked quinoa
4 oz. skim milk
¼ cup pistachio
½ banana
Yogurt Parfait
- 8 oz. low-fat vanilla Greek yogurt
- 1 cup strawberries
- ¼ cup low-fat granola

LUNCH

1 cup butternut squash soup
Smashed chickpea salad sandwich
- ½ cup chickpea mixture: chickpeas, carrot, red onion, dill pickles, mustard, garlic powder, dill, turmeric, black pepper
- Fresh baby spinach or watercress

⅛ avocado
2 slices whole grain bread
2 cups fresh cherries

AFTERNOON SNACK

Cereal, fruit & nut mix
- 1 cup whole grain cereal
- ¼ cup raisins
- 1 oz. (22 kernels) dry-roasted, salted almonds

DINNER

Veggie and edamame peanut noodle stir fry
- 1 cup whole wheat or soba noodles
- 2 cups veggies: broccoli, mushrooms, carrots, bell peppers, scallions, edamame

1½ cups Asian carrot and cucumber salad
- Carrots, cucumbers, pear, cabbage
- 2 tsp. honey vinegar dressing

1 cup skim milk

MORNING SNACK

1 cup cottage cheese; ½ cup fruit

PRE-ACTIVITY SNACK

Smoothie
- 1 banana
- 1 cup frozen berries
- 1 cup orange juice

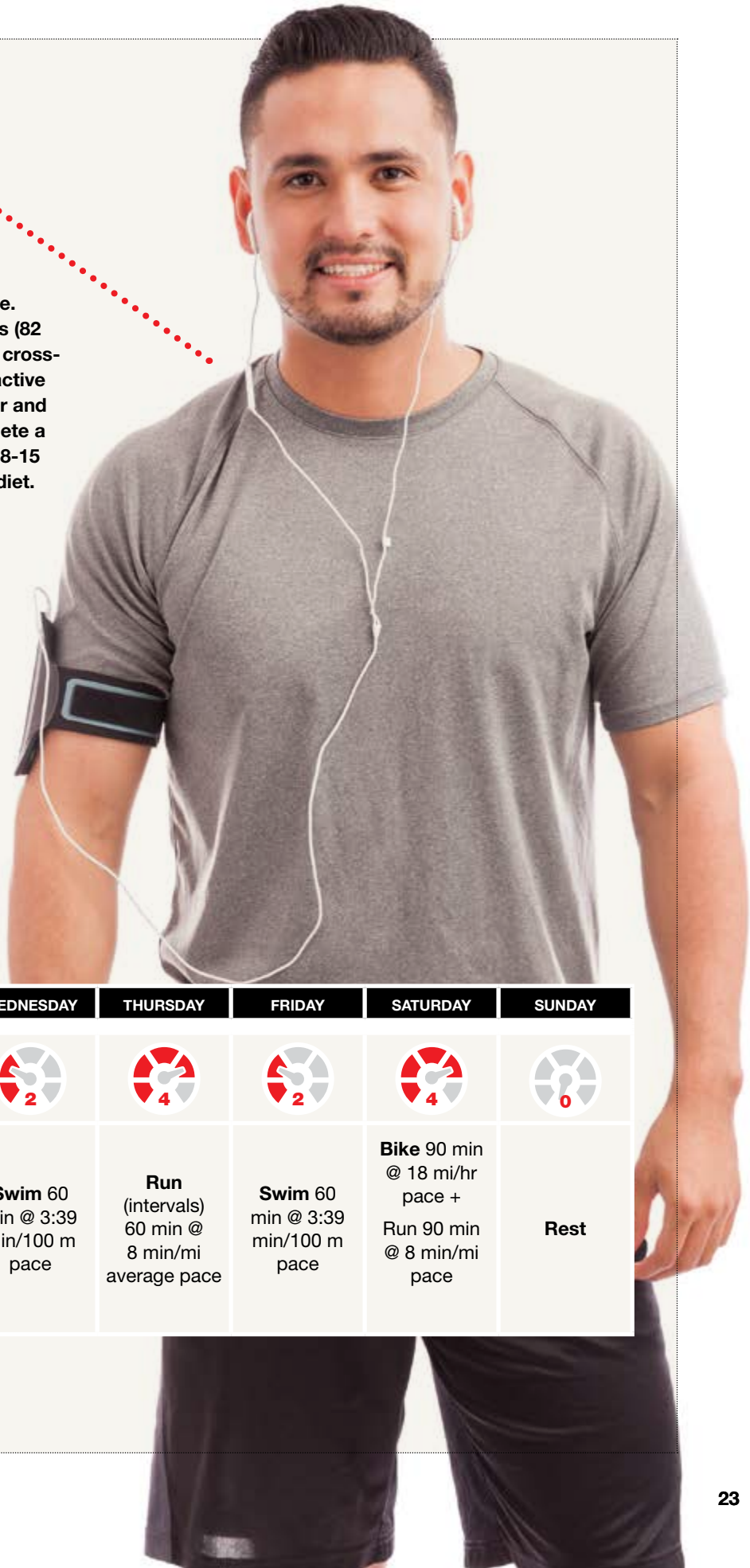
DURING ACTIVITY

24 oz. sports drink

POST-ACTIVITY SNACK

Vanilla Chia Pudding
- ½ cup milk
- 2 Tbsp. chia seed
- ½ tsp. vanilla extract
- 1 Tbsp. maple syrup
- ¼ cup low-fat granola
- ½ cup berries

RAY



Ray is a 35-year-old male triathlete. At 6'0" (183 cm), he weighs 180 lbs (82 kg). As a high school teacher and cross-country coach, he is moderately active at his job. He is a long-time runner and is training for 12 months to complete a half ironman in 5 hours. He trains 8-15 hours/week and eats a balanced diet.

TDEE: 3,051 kcal

Carbohydrate: 6 g/kg = 492 g
Protein: 1.4 g/kg = 115 g
Fat: 20% total kcal = 69 g

Activity Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
2	4	2	4	2	4	0
Swim 60 min @ 3:39 min/100 m pace	**Run** (intervals) 60 min @ 8 min/mi average pace	**Swim** 60 min @ 3:39 min/100 m pace	**Run** (intervals) 60 min @ 8 min/mi average pace	**Swim** 60 min @ 3:39 min/100 m pace	**Bike** 90 min @ 18 mi/hr pace + Run 90 min @ 8 min/mi pace	**Rest**

RAY'S DAILY NUTRITION RECOMMENDATIONS

Table 7. Ray's daily nutrition recommendations

	RECOMMENDATIONS	RAY'S NUTRITION NEEDS	ADDITIONAL FUEL*
30-60 MIN/DAY (SWIM 60 MIN)			
	No change needed from Foundational Diet		
	RECOMMENDATIONS	**RAY'S NUTRITION NEEDS**	**ADDITIONAL FUEL***
60-90 MIN/DAY (RUN 60-MIN INTERVALS)			
Calories	TDEE + (0.15-.21 kcal/kg/min)	4,084 kcal/d	
Carbohydrate	5.5-7 g/kg/d + • 1-2 g/kg 1-4 hr pre-activity • 15-30 g/hr during activity	6.1 x 82 kg = 500 g/d + • 82 g 1-4 hr pre-activity • 15 g/hr during activity Total carbohydrate = 597 g	Pre-Activity Snack: • ½ banana • 6 saltine crackers During Activity Fuel: • 8 oz. sports drink
Protein	1.2-2.0 g/kg/d + • 0.25 g/kg (15-25 g) 0-2 hr post-activity	1.8 g x 82 kg = 148 g/d + • 20 g 0-2 hr post-activity Total protein = 168 g	Post-Activity Recovery Snack: • 16 oz. skim chocolate milk • 3 oz. beef jerky • ½ cup mixed nuts
Fat	20-35% Adjusted Calories	28% Adjusted Calories • 127 g	

*Additional fuel does not include water consumed during activity.

RAY'S DAILY NUTRITION RECOMMENDATIONS

Table 7. Continued

	RECOMMENDATIONS	RAY'S NUTRITION NEEDS	ADDITIONAL FUEL*
120-240+ MIN/DAY (180-MIN BIKE + RUN)			
Calories	TDEE diet + (0.15 x 53 kg) kcal/min	6,151 kcal/d	
Carbohydrate	7-9 g/kg/d + • 1-3 g/kg 1-4 hr pre-activity • Up to 40-65 g/hr during activity	8 x 82 kg = 656 g/d + • 98 g 1-4 hr pre-activity • 40 g/hr during activity = 120 g Total carbohydrate = 874 g	Pre-Activity Snack: Smoothie: • 1 banana • 12 saltine crackers During Activity Fuel: • 8 oz. sports drink • 2 sports gels

Protein	1.2-2.0 g/kg/d +
	• 0.3 g/kg (15-25 g) 0-2 hr post-activity
		1.8 g x 82 kg = 148 g/d +
		• 24 g 0-2 hr post-activity
		Total protein = 172 g
			Post-Activity Recovery Snack:
			• 24 oz. sports drink
			• Smoothie:
			  • 1½ banana
			  • 16 oz. whole milk
			  • ¼ cup peanut butter
			• ½ cup mixed nuts

Fat	20-35% Adjusted Calories	32% Adjusted Calories • 218 g	

*Additional fuel does not include water consumed during activity.

RAY Meal Plan

0 Sun

2 Mon, Wed and Fri

Foundational Diet
(Rest and 60-min swim)

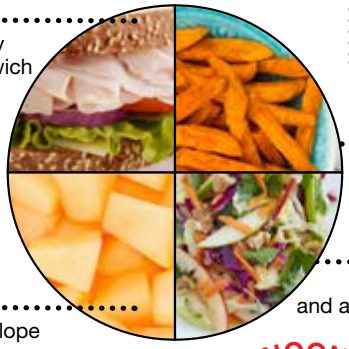
BREAKFAST

English muffins topped with peanut butter and banana

MORNING SNACK

Cereal, fruit and nut mix

Fig bars

LUNCH

Turkey sandwich

Sweet potato fries

Cabbage and apple slaw

Cantelope

AFTERNOON SNACK

Glass of milk

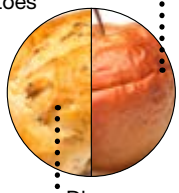
Strawberries

Raw veggies

DINNER

Grilled pork chop

Mashed potatoes


Baked apple

Dinner roll

Salad

Brussels sprouts

4 Tues and Thurs

Level 4 (60-min run intervals) Activity Day

PRE-ACTIVITY

Banana, crackers and juice

DURING ACTIVITY

Sports drink

POST-ACTIVITY

Chocolate milk, beef jerky and mixed nuts

4 Sat

Level 4 (180-min bike + run) Activity Day

PRE-ACTIVITY

Banana, crackers and juice

DURING ACTIVITY

Sports drink and sports gel

POST-ACTIVITY

Sports drink, smoothie, pretzels, trail mix and beef jerky

RAY Meal Plan

Foundational Diet
(Rest and 60-min swim)

0 Sun · 2 Mon, Wed and Fri

BREAKFAST
2 whole wheat English muffins
4 Tbsp. peanut butter
1 large banana

MORNING SNACK
Cereal, fruit and nut mix
- 1 cup cereal
- ¼ cup raisins
- ½ oz. (11 kernels) dry-roasted, salted almonds

4 fig bars

LUNCH
Turkey sandwich
- 2 slices whole wheat bread
- 2 oz. turkey
- 1 oz. Swiss cheese
- Lettuce
- Tomato

Sweet potato fries (1 large sweet potato)
2 cups shredded cabbage and apple slaw
- Cabbage, ½ shredded apple, 2 Tbsp. vinaigrette dressing

2 cups cantaloupe

AFTERNOON SNACK
1 cup raw veggies
½ cup strawberries
16 oz. skim milk

DINNER
3 oz. grilled honey-mustard pork chop
1 cup mashed potatoes
2 cups roasted maple-glazed Brussels sprouts
2 cups salad
- Tomato, onion, cucumber, 2 Tbsp. vinaigrette dressing

1 whole wheat dinner roll
1 baked apple
- Apple, raisins, cinnamon, brown sugar

Level 4 (60-min run intervals) Activity Day

4 Tues and Thurs

BREAKFAST
2 whole wheat English muffins
4 Tbsp. peanut butter
1 large banana

MORNING SNACK
Cereal, fruit and nut mix
- 1 cup cereal
- ¼ cup raisins
- ½ oz. (11 kernels) dry-roasted, salted almonds

4 fig bars

LUNCH
Turkey sandwich
- 2 slices whole wheat bread
- 2 oz. turkey
- 1 oz. Swiss cheese
- Lettuce
- Tomato

Sweet potato fries (1 large sweet potato)
2 cups shredded cabbage and apple slaw
- Cabbage, ½ shredded apple, 2 Tbsp. vinaigrette dressing

2 cups cantaloupe

AFTERNOON SNACK
1 cup raw veggies
½ cup strawberries
16 oz. skim milk

DINNER
3 oz. grilled honey-mustard pork chop
1 cup mashed potatoes
2 cups roasted maple-glazed Brussels sprouts
2 cups salad
- Tomato, onion, cucumber, 2 Tbsp. vinaigrette dressing

1 whole wheat dinner roll
1 baked apple
- Apple, raisins, cinnamon, brown sugar

PRE-ACTIVITY SNACK
1 banana
12 saltine crackers
½ cup grape juice

DURING ACTIVITY
8 oz. sports drink

POST-ACTIVITY SNACK
16 oz. skim chocolate milk
3 oz. beef jerky
½ cup mixed nuts

Level 4 (180-min bike + run) Activity Day

4 Sat

BREAKFAST
2 whole wheat English muffins
4 Tbsp. peanut butter
1 large banana

MORNING SNACK
Cereal, fruit and nut mix
- 1 cup cereal
- ¼ cup raisins
- ½ oz. (11 kernels) dry-roasted, salted almonds

4 fig bars

LUNCH
Turkey sandwich
- 2 slices whole wheat bread
- 2 oz. turkey
- 1 oz. Swiss cheese
- Lettuce
- Tomato

Sweet potato fries (1 large sweet potato)
2 cups shredded cabbage and apple slaw
- Cabbage, ½ shredded apple, 2 Tbsp. vinaigrette dressing

2 cups cantaloupe

AFTERNOON SNACK
1 cup raw veggies
½ cup strawberries
16 oz. skim milk

DINNER
3 oz. grilled honey-mustard pork chop
1 cup mashed potatoes
2 cups roasted maple-glazed Brussels sprouts
2 cups salad
- Tomato, onion, cucumber, 2 Tbsp. vinaigrette dressing

1 whole wheat dinner roll
1 baked apple
- Apple, raisins, cinnamon, brown sugar

PRE-ACTIVITY SNACK
1 banana
12 saltine crackers
1 cup grape juice

DURING ACTIVITY
8 oz. sports drink
1 sports gel

POST-ACTIVITY SNACK
Smoothie
- 1½ bananas, 16 oz. whole milk, ¼ cup peanut butter, ½ cup rolled oats

1 oz. beef jerky
½ cup mixed nuts
¼ cup raisins
2 oz. pretzel twists (~32 pieces)
24 oz. sports drink

AMY

Amy is a 45-year-old female mountain biker. At 5'7" (170 cm), she weighs 150 lbs (68 kg). As a physical therapist, wife and mother of 2 teenagers, her day-to-day activities keep her moderately active. She wants to get faster for an upcoming 6-hour mountain bike race. She trains 5-10 hours/week and eats a balanced diet.

TDEE: 2,174 kcal

Carbohydrate: 5.2 g/kg = 353 g
Protein: 1.2 g/kg = 82 g
Fat: 20% total kcal = 48 g

Activity Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
2	3	0	2	0	3	0
Bike (intervals) 60 min @ 9.5 mi/hr average pace	**Bike** 90 min @ 12 mi/hr (race pace)	**Rest**	**Bike** (intervals) 60 min @ 9.5 mi/hr average pace	**Rest**	**Bike** 270 min @ 11 mi/hr pace	**Rest**

AMY'S DAILY NUTRITION RECOMMENDATIONS

Table 8. Amy's daily nutrition recommendations

	RECOMMENDATIONS	AMY'S NUTRITION NEEDS	ADDITIONAL FUEL*
30-60 MIN/DAY (BIKE 60-MIN INTERVALS)			
	No change needed from Foundational Diet		
	RECOMMENDATIONS	**AMY'S NUTRITION NEEDS**	**ADDITIONAL FUEL***
90-120 MIN/DAY (BIKE 90 MIN)			
Calories	TDEE + (0.12-.15 kcal/kg/min)	2,908 kcal/d	
Carbohydrate	5.5-7 g/kg/d + • 1-2 g/kg 1-4 hr pre-activity • 15-30 g/hr during activity	5.8 x 68 kg = 394 g/d + • 68 g 1-4 hr pre-activity • 15 g/hr during activity = 22.5 g Total carbohydrate = 485 g	Pre-Activity Snack: • ⅔ cup cereal • 1 cup skim milk • 2 Tbsp. raisins During Activity Fuel: • 8 oz. sports drink
Protein	1.2-2.0 g/kg/d + • 0.275 g/kg (15-25 g) 0-2 hr post-activity	1.5 g x 68 kg = 102 g/d + • 18 g 0-2 hr post-activity Total protein = 120 g	Post-Activity Recovery Snack: • 16 oz. skim chocolate milk • 1 cup carrot sticks • ⅓ cup hummus • ½ pita
Fat	20-35% Adjusted Calories	28% Adjusted Calories • 127 g	

*Additional fuel does not include water consumed during activity.

AMY'S DAILY NUTRITION RECOMMENDATIONS

Table 8. Continued

	RECOMMENDATIONS	AMY'S NUTRITION NEEDS	ADDITIONAL FUEL*
120-240+ MIN/DAY (BIKE 270 MIN)			
Calories	TDEE + (0.15-.21 kcal/kg/min)	6,151 kcal/d	
Carbohydrate	7-9 g/kg/d + • 1-3 g/kg 1-4 hr pre-activity • Up to 40-65 g/hr during activity	8 x 82 kg = 656 g/d + • 98 g 1-4 hr pre-activity • 40 g/hr during activity = 120 g Total carbohydrate = 874 g	Pre-Activity Snack: • 2 slices whole wheat bread • 2 Tbsp. peanut butter • 2 Tbsp. jelly • 1 banana • 6 saltine crackers During Activity Fuel: • 8 oz. sports drink • 1 sports gel

Protein	1.2-2.0 g/kg/d +
	• 0.3 g/kg, (15-25 g) 0-2 hr post-activity
		1.8 g x 82 kg = 148 g/d +
		• 24 g 0-2 hr post-activity
		Total protein = 172 g
			Post-Activity Recovery Snack:
			• Smoothie:
			  • 1 cup orange juice
			  • 1 banana
			  • 1½ cup berries
			  • ¼ cup rolled oats
			  • Ice
			• Bagel with:
			  • 2 Tbsp. low-fat cream cheese
			  • 1 cup cucumber slices
			  • 3 oz. smoked salmon

Fat	20-35% Adjusted Calories	31% Adjusted Calories • 100 g	

*Additional fuel does not include water consumed during activity.

Meal Plan

0 Wed, Fri and Sun

2 Mon and Thurs

Foundational Diet

(Rest and 60-min bike intervals)

BREAKFAST

Oatmeal with milk and walnuts

MORNING SNACK

Banana and blueberries

LUNCH

South-western salad

Canned pears

Yogurt

AFTERNOON SNACK

Pretzels and raisins

DINNER

Sweet potato

Grilled zucchini

Chili

Salad

3 Tues

Level 3

(90-min bike)

Activity Day

PRE-ACTIVITY

Cereal, milk and raisins

DURING ACTIVITY

Sports drink

POST-ACTIVITY

Chocolate milk, carrots, hummus and pita

3 Sat

Level 3

(270-min bike)

Activity Day

PRE-ACTIVITY

Peanut butter and jelly sandwich, banana and crackers

DURING ACTIVITY

Sports drink and sports gel

POST-ACTIVITY

Smoothie with a bagel with cream cheese, cucumber and smoked salmon

EVENING SNACK

Cereal, fruit and nut mix

AMY

Meal Plan

Foundational Diet

(Rest and 60-min bike intervals)

0 Wed, Fri and Sun

2 Mon and Thurs

BREAKFAST

1 cup rolled oats
½ tsp. cinnamon
1 Tbsp. maple syrup
1 tsp. butter
½ oz. walnuts
1 cup skim milk

MORNING SNACK

1 small banana
1 cup blueberries

LUNCH

Southwestern salad

- 2 cups romaine
- 2 cups spinach
- 2 cups additional raw veggies: tomatoes, red onion, jicama, carrots, radishes
- 2 oz. grilled chicken breast
- 2 Tbsp. corn
- ½ cup black beans
- ¼ avocado
- 2 Tbsp. cilantro lime dressing

1 cup canned pears, packed in juice
8 oz. fat-free vanilla yogurt

AFTERNOON SNACK

16 pretzel twists
2 Tbsp. raisins

DINNER

Medium-sized baked sweet potato topped with 1⅓ cup bean chili and scallions
2 cups grilled/roasted zucchini
Arugula salad

- 2 cups arugula, 1 small apple, 2 Tbsp. dried cranberries, 2 Tbsp. vinaigrette

Level 3 (90-min bike) Activity Day

3 Tues

BREAKFAST

1 cup rolled oats
½ tsp. cinnamon
1 Tbsp. maple syrup
1 tsp. butter
½ oz. walnuts
1 cup skim milk

MORNING SNACK

1 small banana
1 cup blueberries

LUNCH

Southwestern salad

- 2 cups romaine
- 2 cups spinach
- 2 cups additional raw veggies: tomatoes, red onion, jicama, carrots, radishes
- 2 oz. grilled chicken breast
- 2 Tbsp. corn
- ½ cup black beans
- ¼ avocado
- 2 Tbsp. cilantro lime dressing

1 cup canned pears, packed in juice
8 oz. fat-free vanilla yogurt

AFTERNOON SNACK

16 pretzel twists
2 Tbsp. raisins

DINNER

Medium-sized baked sweet potato topped with 1⅓ cup bean chili and scallions
2 cups grilled/roasted zucchini
Arugula salad

- 2 cups arugula, 1 small apple, 2 Tbsp. dried cranberries, 2 Tbsp. vinaigrette

PRE-ACTIVITY SNACK

Smoothie
1 banana
12 saltine crackers
½ cup grape juice

DURING ACTIVITY

8 oz. sports drink

POST-ACTIVITY SNACK

16 oz. skim chocolate milk
1 cup carrot sticks
⅓ cup hummus
½ pita

Level 3 (270-min bike + run) Activity Day

3 Sat

BREAKFAST

1 cup rolled oats
½ tsp. cinnamon
1 Tbsp. maple syrup
1 tsp. butter
½ oz. walnuts
1 cup skim milk

MORNING SNACK

1 small banana
1 cup blueberries

LUNCH

Southwestern salad

- 2 cups romaine
- 2 cups spinach
- 2 cups additional raw veggies: tomatoes, red onion, jicama, carrots, radishes
- 2 oz. grilled chicken breast
- 2 Tbsp. corn
- ½ cup black beans
- ¼ avocado
- 2 Tbsp. cilantro lime dressing

1 cup canned pears, packed in juice
8 oz. fat-free vanilla yogurt

AFTERNOON SNACK

16 pretzel twists
2 Tbsp. raisins

DINNER

Medium-sized baked sweet potato topped with 1⅓ cup bean chili and scallions
2 cups grilled/roasted zucchini
Arugula salad

- 2 cups arugula, 1 small apple, 2 Tbsp. dried cranberries, 2 Tbsp. vinaigrette

PRE-ACTIVITY SNACK

2 slices whole wheat bread
2 Tbsp. peanut butter
2 Tbsp. jelly
1 banana
6 saltine crackers

DURING ACTIVITY

8 oz. sports drink
1 sports gel

POST-ACTIVITY SNACK

Smoothie

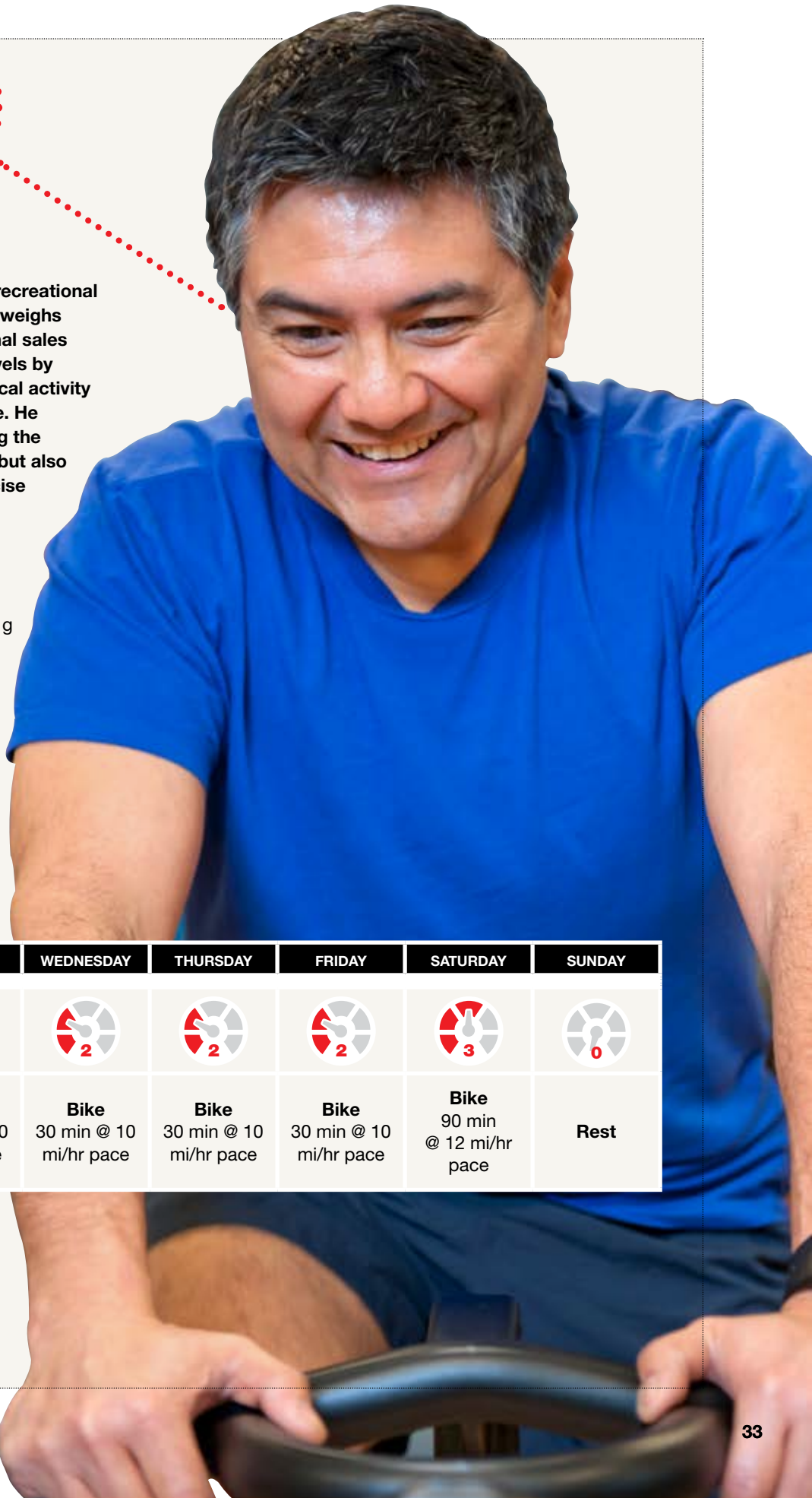
- 1 cup orange juice
- 1 banana
- 1 ½ cup berries
- ¼ cup rolled oats
- Ice

Bagel with 2 Tbsp. low-fat cream cheese + 1 cup cucumber slices + 3 oz. smoked salmon

EVENING SNACK

2 cups shredded wheat cereal with ½ cup raisins, ¼ cup cashews and 1 cup dried chickpeas

PAUL



Paul is a 49-year-old male recreational biker. At 5'10" (178 cm), he weighs 176 lbs. (80 kg). As a regional sales manager, he frequently travels by car and gets minimal physical activity outside of planned exercise. He exercises 30 minutes during the week on a stationary bike, but also bikes with friends for exercise and fun on the weekend.

TDEE: 2,681 kcal

Carbohydrate: 5 g/kg = 400 g
Protein: 1.4 g/kg = 112 g
Fat: 23% total kcal = 69 g

Activity Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
2	2	2	2	2	3	0
Bike 30 min @ 10 mi/hr pace	**Bike** 30 min @ 10 mi/hr pace	**Bike** 30 min @ 10 mi/hr pace	**Bike** 30 min @ 10 mi/hr pace	**Bike** 30 min @ 10 mi/hr pace	**Bike** 90 min @ 12 mi/hr pace	**Rest**

PAUL'S DAILY NUTRITION RECOMMENDATIONS

Table 9. Paul's daily nutrition recommendations

	RECOMMENDATIONS	PAUL'S NUTRITION NEEDS	ADDITIONAL FUEL*
30-60 MIN/DAY (BIKE 30 MIN)			
	No change needed from Foundational Diet		
	RECOMMENDATIONS	**PAUL'S NUTRITION NEEDS**	**ADDITIONAL FUEL***
90-120 MIN/DAY (BIKE 90 MIN)			
Calories	TDEE + (0.12-.15 kcal/kg/min)	3,545 kcal/d	
Carbohydrate	5-7 g/kg/d + • 1-2 g/kg 1-4 hr pre-activity • 15-30 g/hr during activity	5.5 g/kg/d + • 80 g/kg 1-4 hr pre-activity • 15g/hr during activity = 22.5 g Total carbohydrate = 543 g	Pre-Activity Snack: • 2 cups cereal • 4 oz. fat-free milk • ¼ cup raisins During Activity Fuel: • 12 oz. sports drink
Protein	1.2-2.0 g/kg/d + • 0.275 g/kg (15-25 g) 0-2 hr post-activity	1.6 g x 80 kg + • 22 g 0-2 hr post-activity Total protein = 150 g	Post-Activity Recovery Snack: • ½ cup hummus • ½ cup raw celery and carrot sticks
Fat	20-35% Adjusted Calories	21.5% Adjusted Calories • 85 g	

*Additional fuel does not include water consumed during activity.

PAUL Meal Plan

0 Sun

2 Week-day

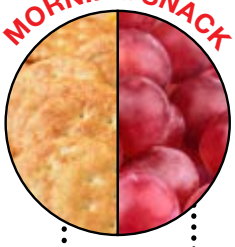
Foundational Diet

(Rest and 30-min bike)

BREAKFAST

Oatmeal with walnuts and peanut butter

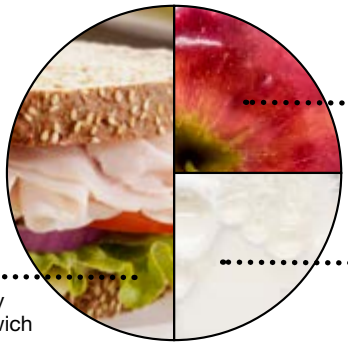
MORNING SNACK



Crackers

Grapes

LUNCH



Apple

Turkey sandwich

Glass of skim milk

DINNER

Citrus-glazed salmon and brown rice

Sautéed vegetables

Salad

EVENING SNACK

Greek yogurt with strawberries

+

3 Sat

Level 3

(90-min bike)

Activity Day

PRE-ACTIVITY

Cereal, milk and raisins

DURING ACTIVITY

Sports Drink

POST-ACTIVITY

Hummus and veggies

Meal Plan

Foundational Diet
(Rest and 30-min bike)

Sun 0 | Week-day 2

BREAKFAST
Oatmeal
- 8 oz. fat-free milk
- 1 cup rolled oats
- 1 oz. roasted walnuts
- 1 Tbsp. chia seeds
- 2 Tbsp. raisins
- ½ tsp. cinnamon
- 2 tbsp. peanut butter

1 medium banana

MORNING SNACK
12 whole wheat crackers

1½ cups grapes

LUNCH
Turkey sandwich
- 2 slices whole-wheat bread
- 2 oz. sliced turkey
- Lettuce
- Tomato
- Cucumber
- ⅓ avocado

8-oz fat-free milk

Medium apple

DINNER
3 oz. citrus glazed salmon

1 cup steamed brown rice

⅔ cup roasted sweet potatoes

½ cup sautéed snow peas, red peppers, and onions

2 cups tossed mixed greens salad with tomato, celery, onion and 3 Tbsp. balsamic vinaigrette

EVENING SNACK
6 oz. strawberry Greek yogurt

1½ cup strawberries

Level 3 (90-min bike)
Activity Day

Sat 3

BREAKFAST
Oatmeal
- 8 oz. fat-free milk
- 1 cup rolled oats
- 1 oz. roasted walnuts
- 1 Tbsp. chia seeds
- 2 Tbsp. raisins
- ½ tsp. cinnamon
- 2 tbsp. peanut butter

1 medium banana

MORNING SNACK
12 whole wheat crackers

1½ cups grapes

LUNCH
Turkey sandwich
- 2 slices whole-wheat bread
- 2 oz. sliced turkey
- Lettuce
- Tomato
- Cucumber
- ⅓ avocado

8-oz fat-free milk

Medium apple

DINNER


3 oz. citrus glazed salmon

1 cup steamed brown rice

⅔ cup roasted sweet potatoes

½ cup sautéed snow peas, red peppers, and onions

2 cups tossed mixed greens salad with tomato, celery, onion and 3 Tbsp. balsamic vinaigrette

EVENING SNACK
6 oz. strawberry Greek yogurt

1½ cup strawberries

PRE-ACTIVITY SNACK
1 cup cereal

4 oz. skim milk

¼ cup raisins

DURING ACTIVITY
12 oz. sports drink

POST-ACTIVITY SNACK
½ cup hummus

½ cup raw celery and carrot sticks

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Methodology: Recommendations in the *Active Nutrition Guide* are based on a comprehensive review of the latest scientific evidence. Core sports nutrition references include the Dietary Guidelines for Americans,[4] the Physical Activity Guidelines for Americans,[2] and the Position of the Academy of Nutrition and Dietetics, Dietitians of Canada and the American College of Sports Medicine: Nutrition and Athletic Performance.[7] A literature review was performed using PubMed and search terms including (but not limited to): nutrition and athletic performance, protein athletes, periodization athletes, recovery athletes, carbohydrate athletes. The Mifflin-St. Jeor prediction equation is used to estimate RMR[17] and PAL to estimate routine physical activity level.[14] The 2011 Compendium of Physical Activities (complete) is used as guidance for energy expenditure from planned activity for each of the athlete scenarios.[18] Meal plans are designed using the American Dietetics Association and The American Dietetic Association Diabetic Exchange List.[15] Recommendations are also supported by the expertise, personal experience and health professional peers of the authors.

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