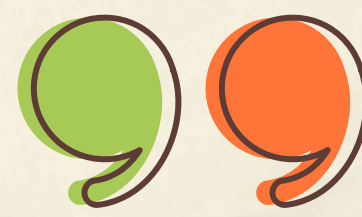


Fueling 101

Grace McKelvey
West Chester University Dietetic Intern

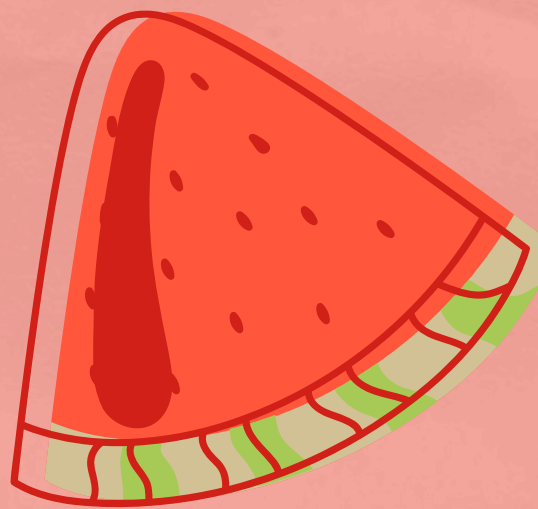
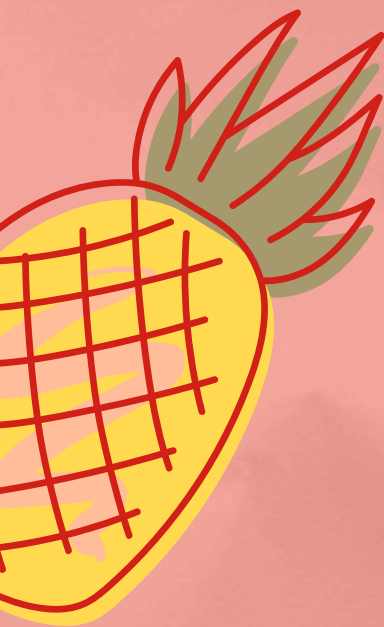


TRUE OR FALSE

- 1 You need more protein than carbohydrates after a workout**
- 2 Before a workout, it's best to eat carbohydrates that are low in fiber**
- 3 Portion and serving sizes are the same for athletes and non-athletes**
- 4 There are no complete protein options for vegetarians**

About Me





Today's Agenda

- 1 Benefits

- 2 Your macronutrient friends

- 3 What to eat before, during, & after

- 4 Fueling as a vegetarian

- 5 Eating on-the-go

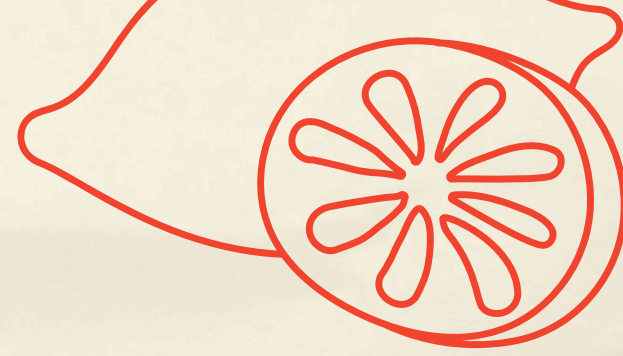
- 6 RED-S

- 7 Anti-doping



Benefits of fueling properly

- Maintain good health
- Optimize sports performance
- Supports growth and development
- Assists with recovery



MACRONUTRIENTS

Carbohydrates (carbs)

- Main source of energy/fuel
- The more carbs available during exercise, the better you perform

Protein

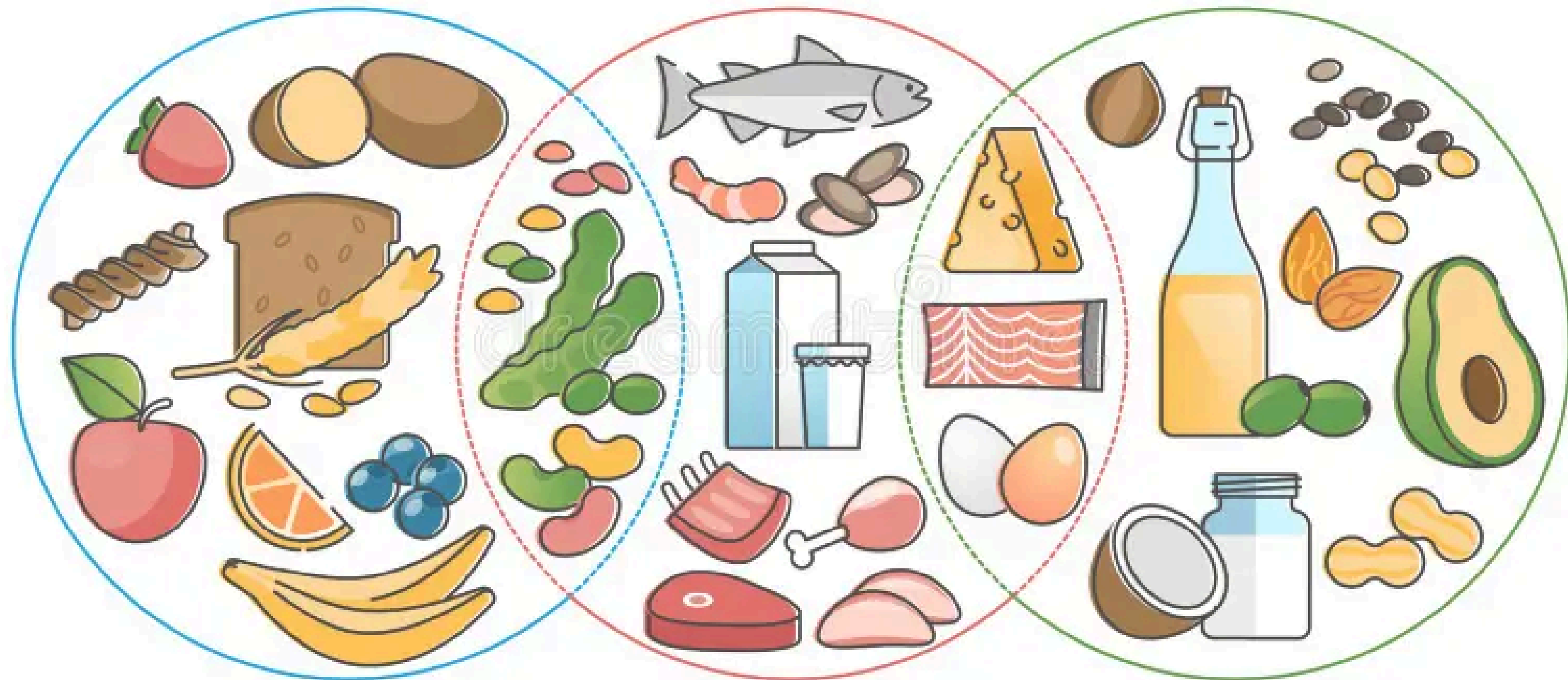
- Muscle growth, body repair, carry oxygen, immune system

Fat

- Fat-soluble vitamins, long term energy, burn more fat



MACRONUTRIENTS



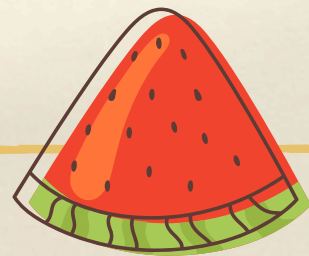
CARBS

PROTEIN

FATS

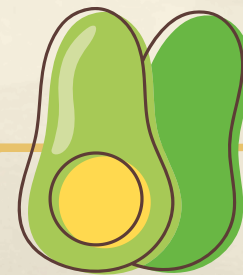
CARBOHYDRATES

45-60%



Fuel

The body's **MAIN** source of energy for moderate-high intensity exercise



Storage

The storage form of carbs in the muscle and liver is called glycogen

Carbs before and after training keeps glycogen stocked and helps prevent fatigue



Glycogen

Muscle glycogen is a source of muscle contraction

Liver glycogen provides constant energy to the brain and muscle during exercise

CARBOHYDRATES

Simple Carbohydrates

TYPES

- Added sugars (e.g. table sugar, cane sugar, corn syrup)
- Naturally occurring sugars (e.g. milk and fruit)

FUNCTION

- Digest quickly
- Create quick bursts of energy



Complex Carbohydrates

TYPES

- Refined sugars (e.g. white flour, white rice)
- Unrefined sugars (e.g. brown rice quinoa, whole wheat pastas and bread)

FUNCTION

- Digest slowly
- Slower release of energy

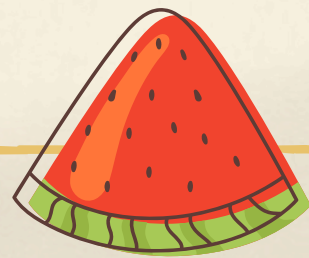


CARBOHYDRATE SOURCES

Food	Portion	Carbohydrates
Apple	8 oz.	30 g
Bagel	½ Bagel	30 g
Banana	8 oz.	30 g
Bread	2 Slices	30 g
Corn	1 Cup	30 g
Dried Fruit	4 Tablespoons	30 g
Honey	2 Tablespoons	30 g
Pasta	2/3 Cup Cooked	30 g
Potato (Baked)	6 oz.	30 g
Rice	2/3 Cup Cooked	30g
Sports Drink	~20 oz.	30 g

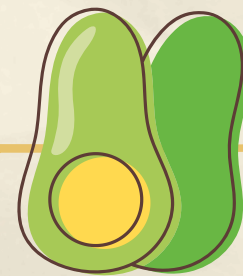
PROTEIN

10-30%



Function

- Repair, remodel, and growth of muscle protein



Type & Quality

- Digestibility & amino acid score
- The more essential amino acids the better (e.g. leucine)



Recovery

- Optimal timing window to consume protein is unknown
- Recommended ingestion of proteins within 4 hours of recovery

PROTEIN

Complete Protein

SOURCES

- Animal-based (red meat, poultry, eggs, fish)
- Dairy (milk, yogurt, cheese, cottage cheese)
- Plant-based (lentils, quinoa, soy, buckwheat)
- Contains ALL 9 essential amino acids



Incomplete Protein

SOURCES

- Plant-based products (beans, nuts, seeds, rice, whole grains,
- Lacks 1 or more of the essential amino acids
- Eat a variety!

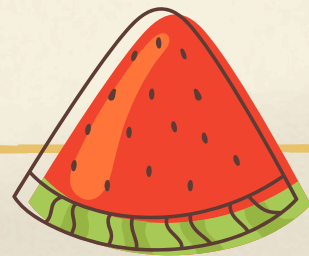


PROTEIN SOURCES

Food	Portion	Protein Amount
Beef/Poultry/Fish	3 oz.	~ 21 g
Cottage Cheese	1 Cup	~ 25 g
Eggs	3 Eggs	~ 21 g
Legumes (Beans/Lentils)	1 Cup	~ 20g
Milk	2 Cups	16 g
Milk (Almond)	1 Cup	1 g
Milk (Soy)	1 Cup	7 g
Peanut Butter	2 Tbsp.	8 g
Greek Yogurt	1 Cup	~ 20 g
String Cheese	2	~ 15 g

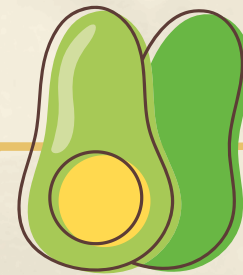
FAT

25-35%



Fuel

- Source of energy during low aerobic exercise (e.g. swimming)
- Provides most of the energy for moderate intensity exercise



Use

- More fat is used for energy when exercise lasts over 90 minutes
- Dietary intake before and during exercise impact this



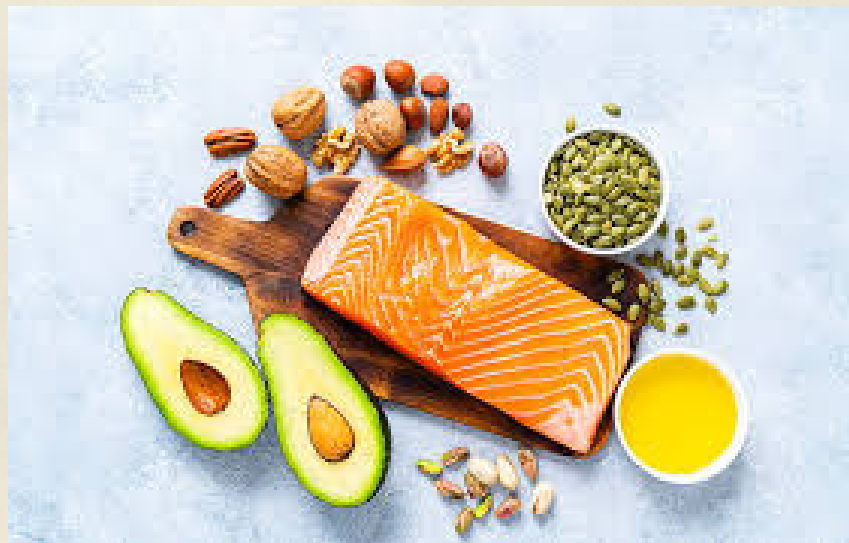
Role

- Provide energy, transport vitamins, promote hormone production

FAT

Unsaturated Fat

- Mostly plant sources
- Liquid at room temperature
- Essential fatty acids (omega 3s, omega 6s)
- Used for energy

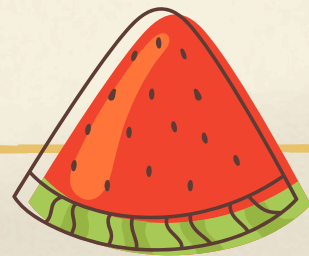


Saturated Fat

- Mostly animal sources and oils that
- Solid at room temperature
- More likely to be stored than used for energy

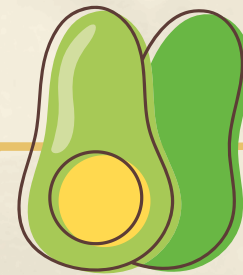


Fruits and Veggies



Vitamins

- Provide the resources needed to break down food for energy
- Healthy bones & strong immune system
- Vitamin A,D, E, K, B vitamins



Minerals

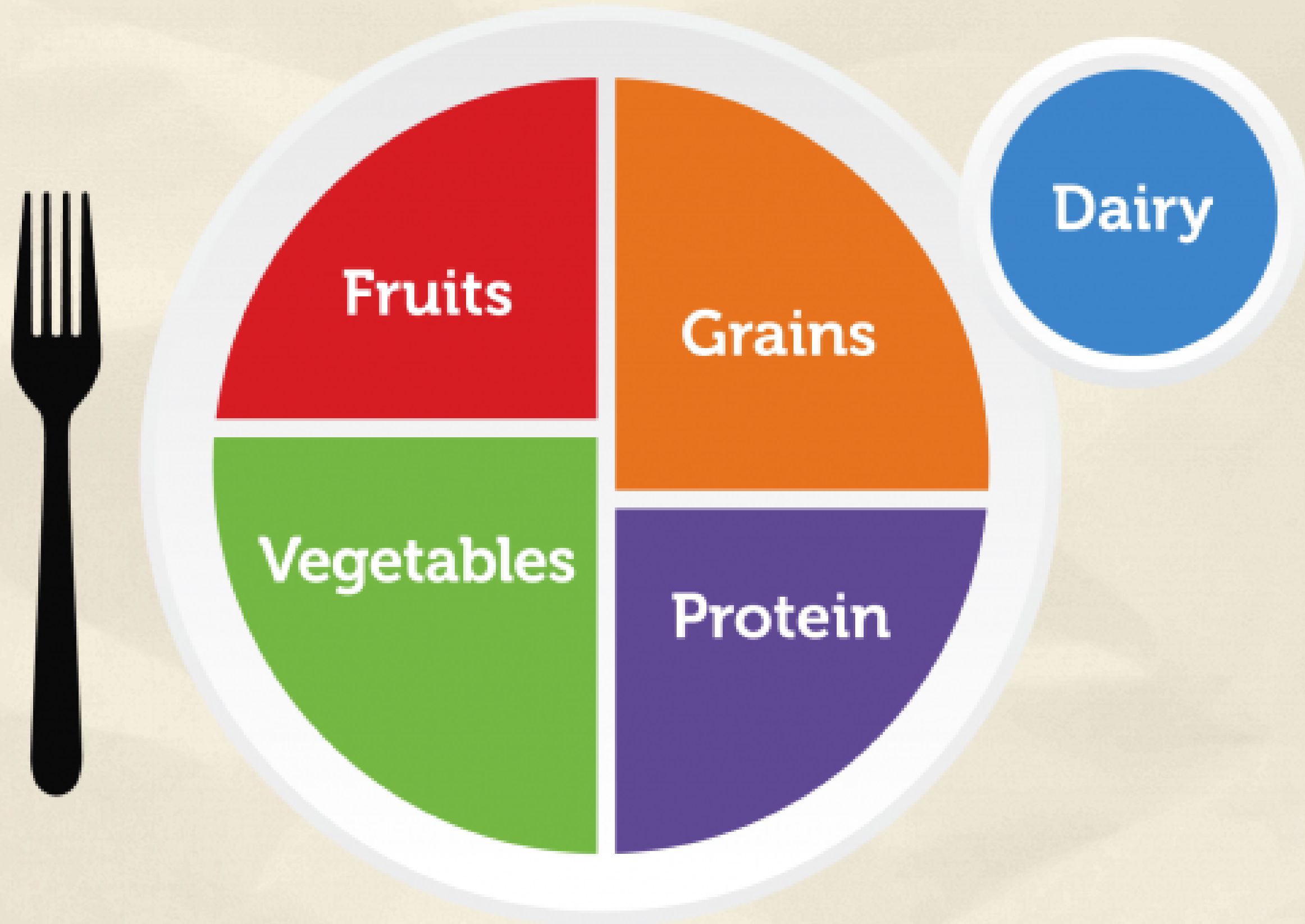
- Fluid balance
- Oxygen transportation
- Energy production
- Potassium, sodium, zinc, magnesium, iron



Variety

- 5 servings/day
- Eating a variety ensures meeting daily requirements for vitamins and minerals

My Plate



Easy Training

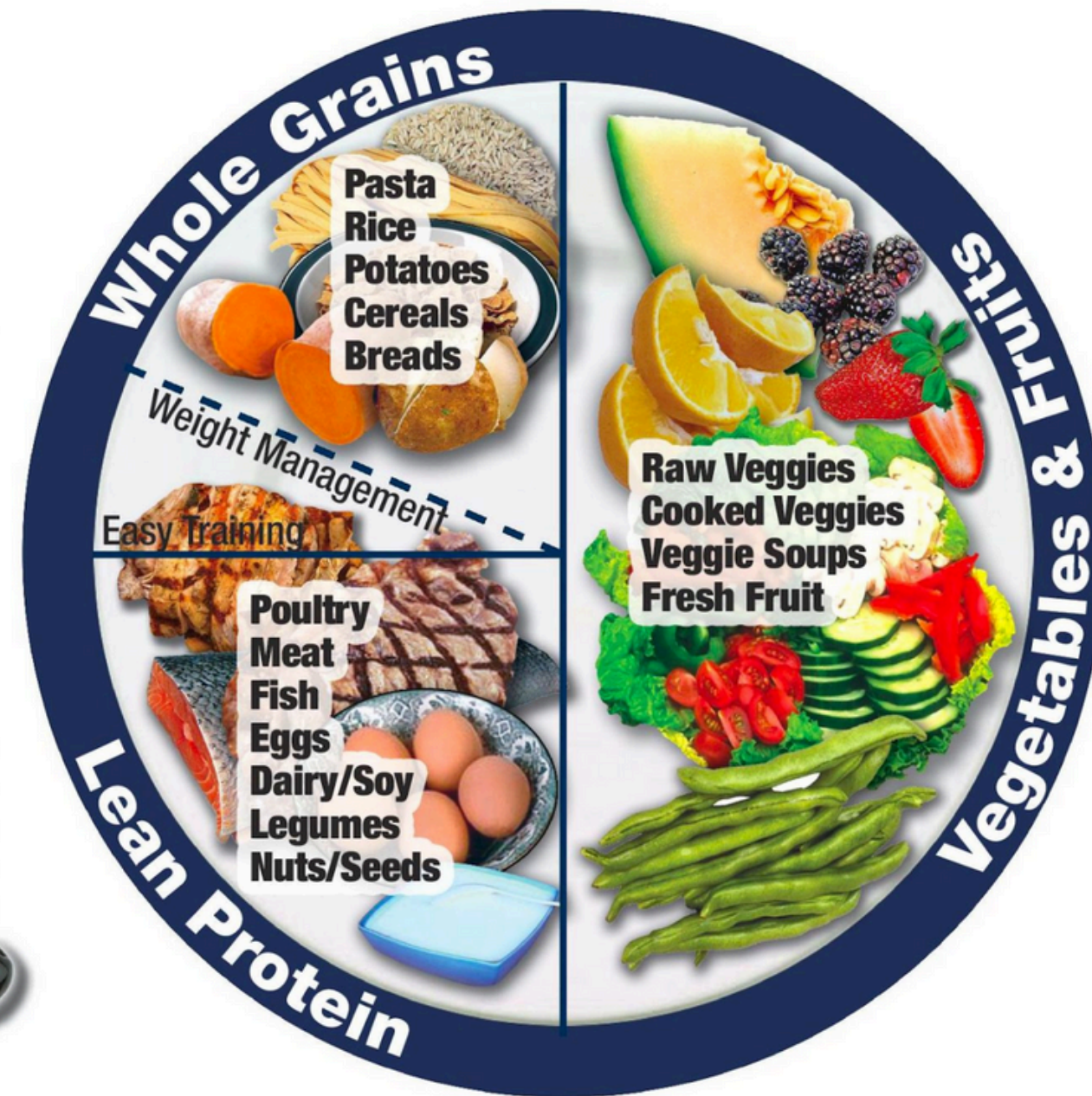
EASY TRAINING / WEIGHT MANAGEMENT:

FATS

1-3 Teaspoon(s)



Avocado
Oils
Nuts
Seeds
Cheese
Butter



Water
Dairy/Nondairy
Beverages
Diluted Juice
Flavored
Beverages



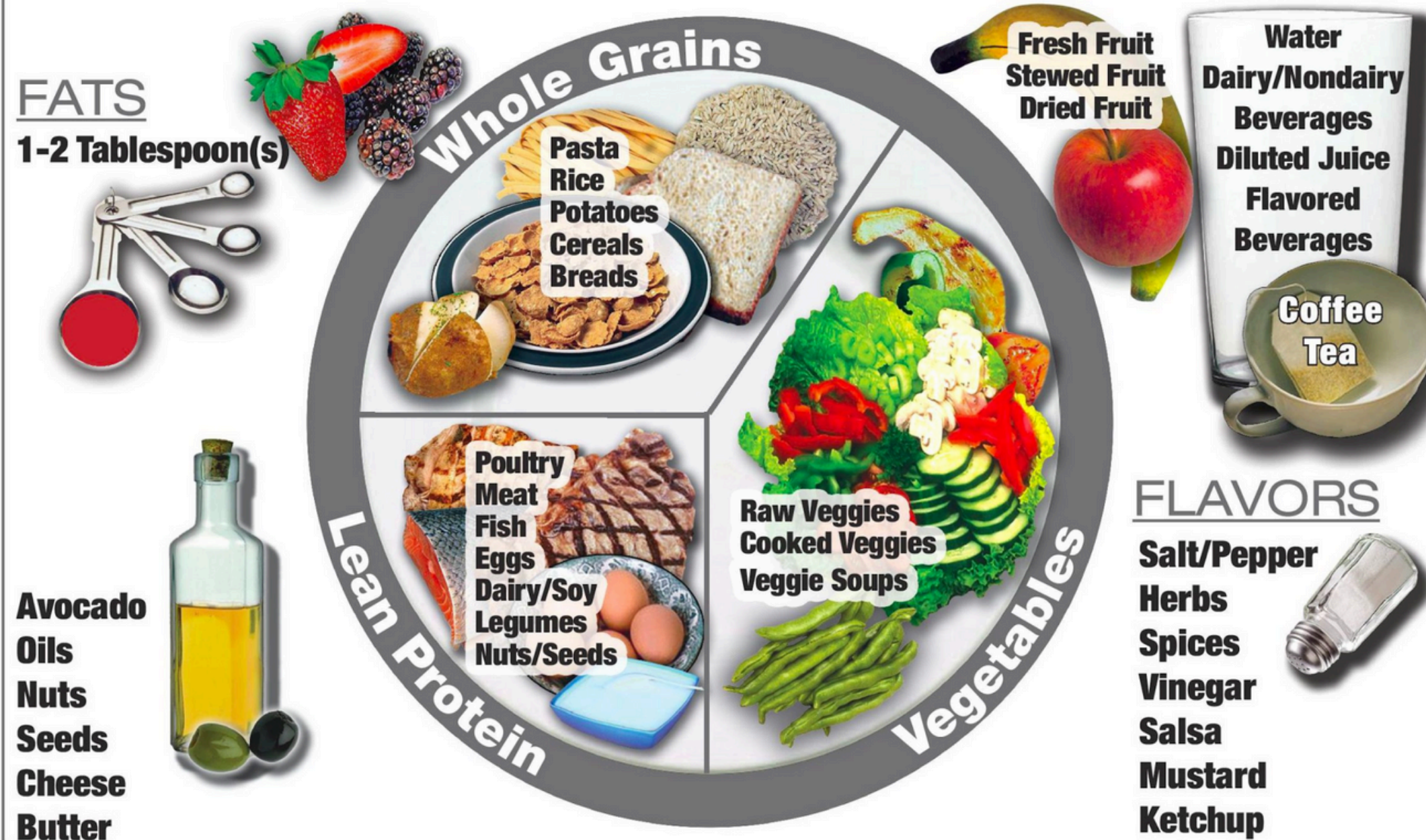
FLAVORS

Salt/Pepper
Herbs
Spices
Vinegar
Salsa
Mustard
Ketchup



Moderate Training

MODERATE TRAINING:



Hard/Intense Training

HARD TRAINING:

FATS

2-3 Tablespoons



Avocado
Oils
Nuts
Seeds
Cheese
Butter



Grains

Pasta
Rice
Potatoes
Cereals
Breads



Fresh Fruit
Stewed Fruit
Dried Fruit



Water
Dairy/Nondairy
Beverages
Diluted Juice
Flavored
Beverages



Coffee
Tea

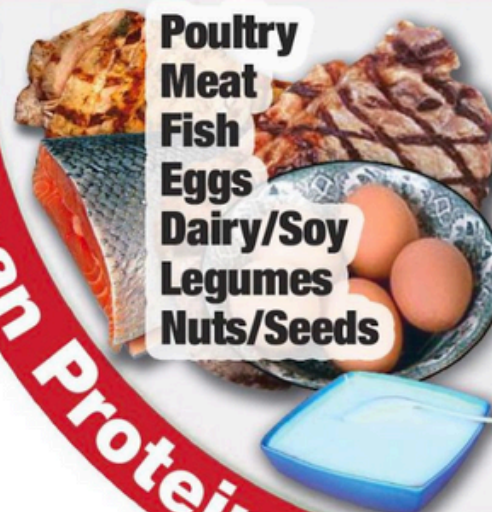
FLAVORS

Salt/Pepper
Herbs
Spices
Vinegar
Salsa
Mustard
Ketchup



Lean Protein

Poultry
Meat
Fish
Eggs
Dairy/Soy
Legumes
Nuts/Seeds



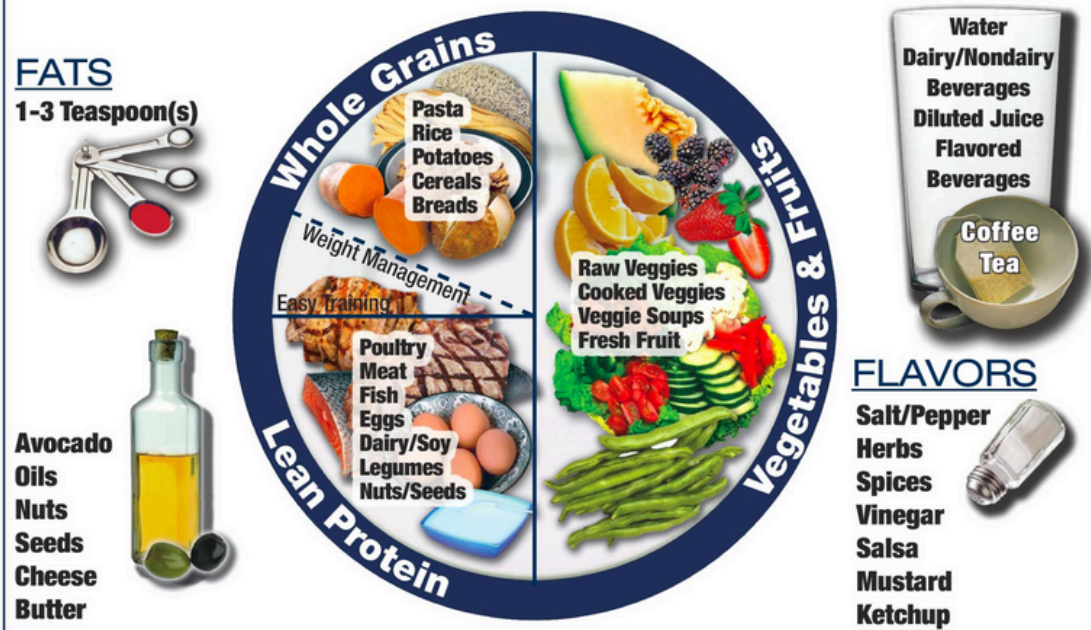
Cooked Veggies
Veggie Soups
Raw Veggies



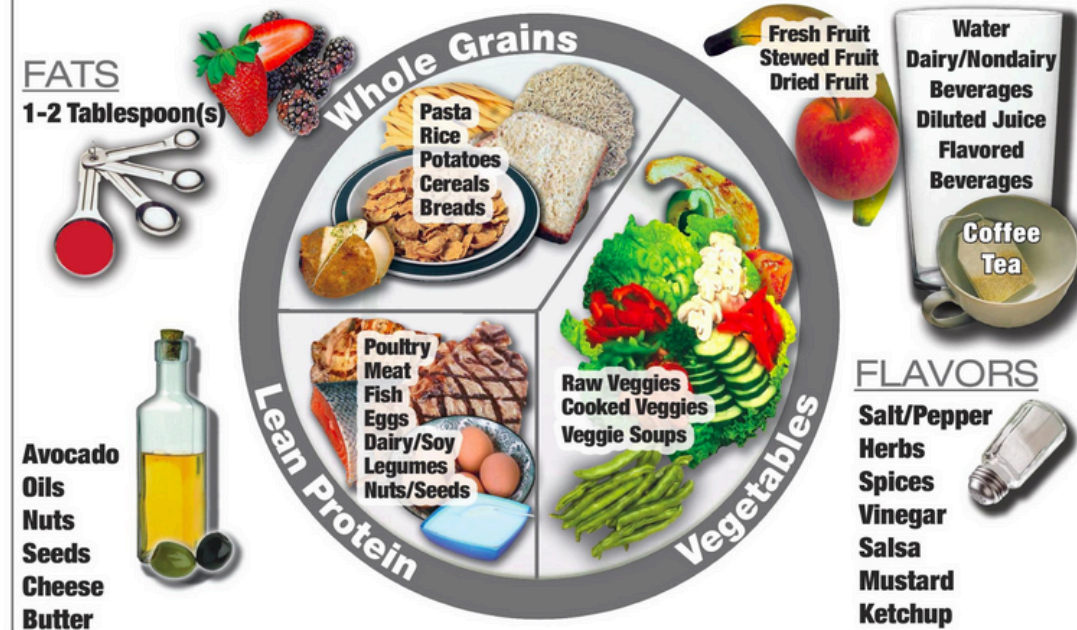
Vegetables

What do you notice?

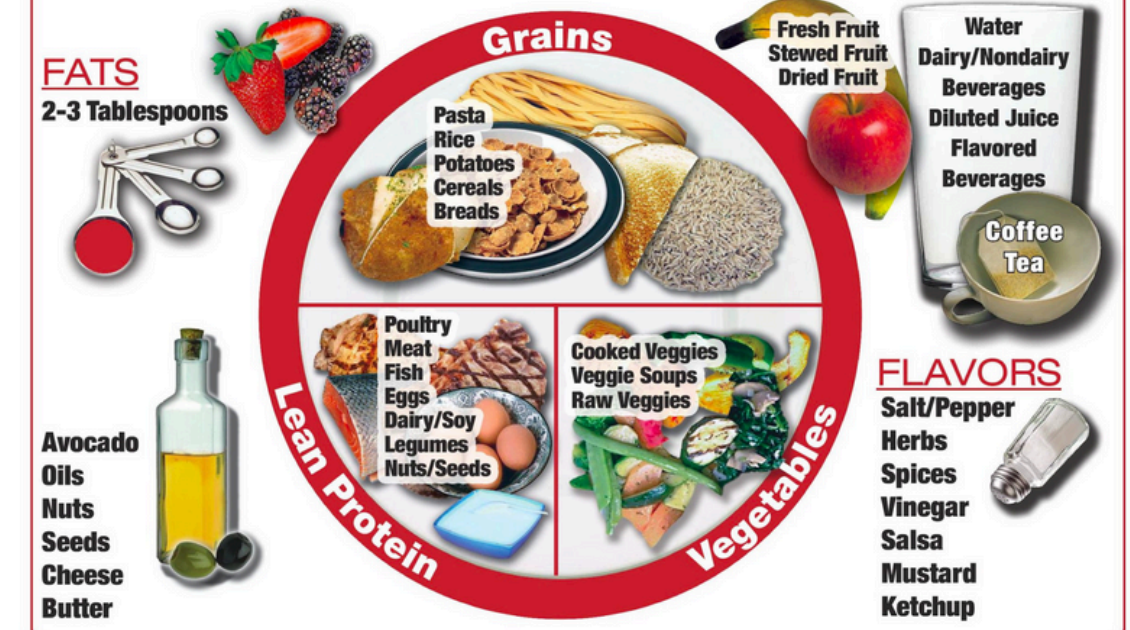
EASY TRAINING / WEIGHT MANAGEMENT:



MODERATE TRAINING:

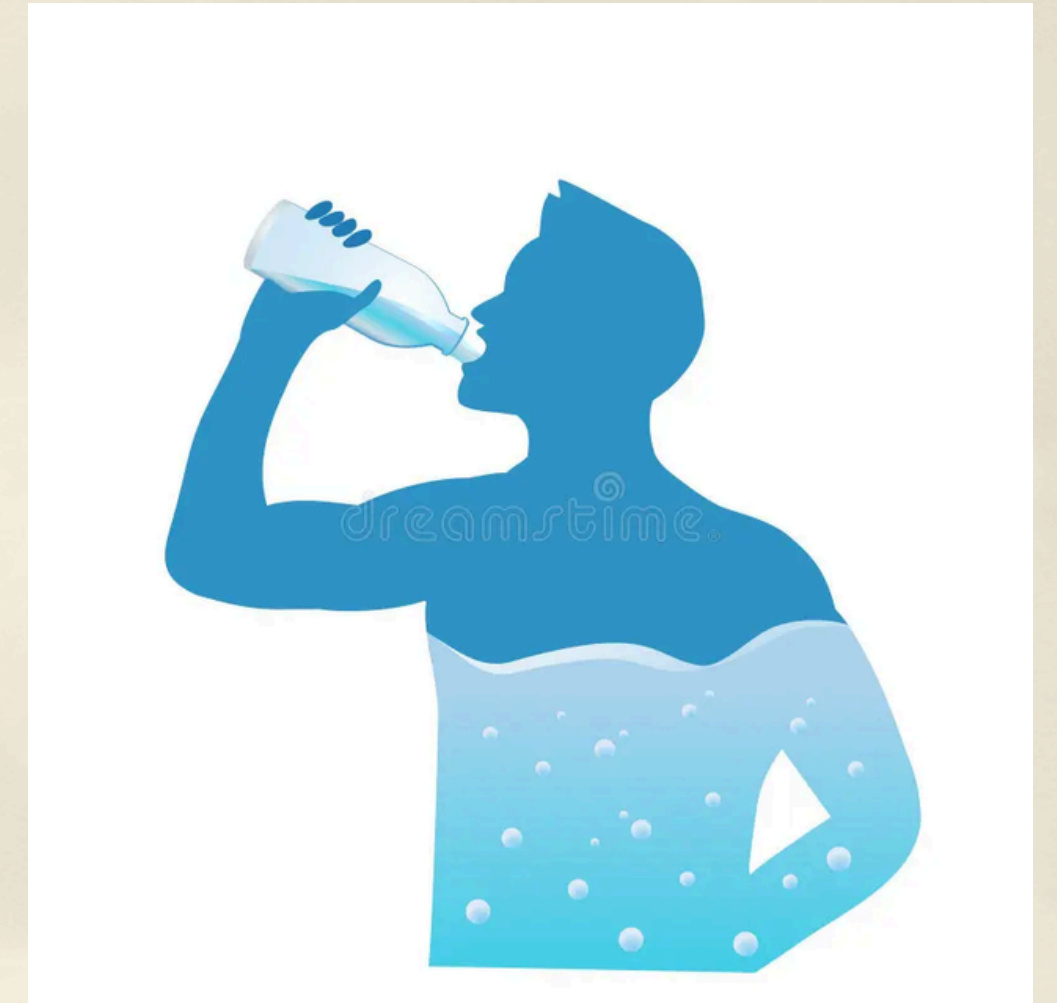


HARD TRAINING:



Hydration

- Greater fluid needs than adults
- Always hydrate **BEFORE** meet/practice (1 1/2 - 3 cups water)
- 5-9 ounces every 15-20 minutes during exercise
 - 8 ounces = 1 cup
- Sport drinks
 - Sugar helps bring water into your cells



Dehydration

Know the signs

- Dizziness
- Headache
- Cramps
- Brain fog

When your muscles are dehydrated:

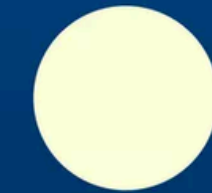
- Performance decreases
- Increased injury risk

WHAT THE COLOR OF YOUR URINE SAYS ABOUT YOUR HYDRATION



CLEAR

You might be drinking *too* much water.



PALE YELLOW

Great work! You're well-hydrated.



YELLOW

You're pretty average as far as hydration goes.



DARK YELLOW

You probably need a glass of water soon.



HONEY

Your body needs more water.



BROWN

You're very dehydrated or you may have an underlying condition.

Energy Needs

Factors that impact energy needs

- Training intensity
- Training duration
- Participation in more than 1 sport
- Growth and development needs
- Competition load



Fueling Around Exercise

Before

Morning event

- Night before: high carb, moderate protein (oatmeal with nuts and berries)
- Morning of event: Low fiber, low fat, low protein, high in simple carbs (e.g. 1/2 whole wheat bagel with low fat cream cheese and jam, medjool dates)



Fueling Around Exercise

Before

Late morning/ Early afternoon event

- Eat every 2.5-3.5 hours
- Low fat, low fiber, moderate protein
 - 400 kcal meal, 3-4 hours prior (e.g. egg whites, bagel with banana)
 - 200 kcal snack, 1-2 hours prior (e.g. hummus and carrots, dried fruit)



Fueling Around Exercise

During

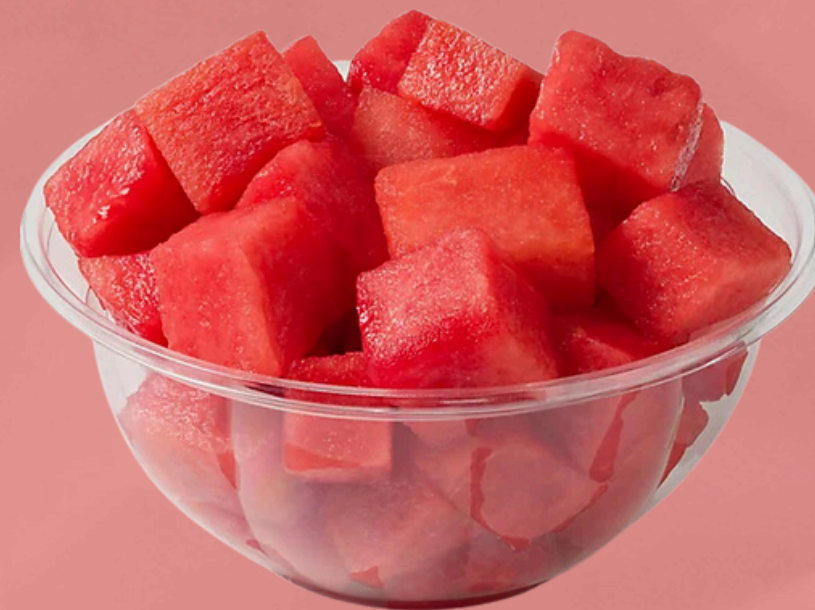
Events longer than 60 minutes

Food (30 grams carbohydrates/hour)

- Hydrating fruit (cantaloupe, oranges, clementines, watermelon)
- Gel chews
- Pretzels
- Crackers

Hydration

- 5-9 ounces every 15-20 minutes
- ** 8 ounces = 1 cup
- Sports drinks, water



Fueling Around Exercise

After

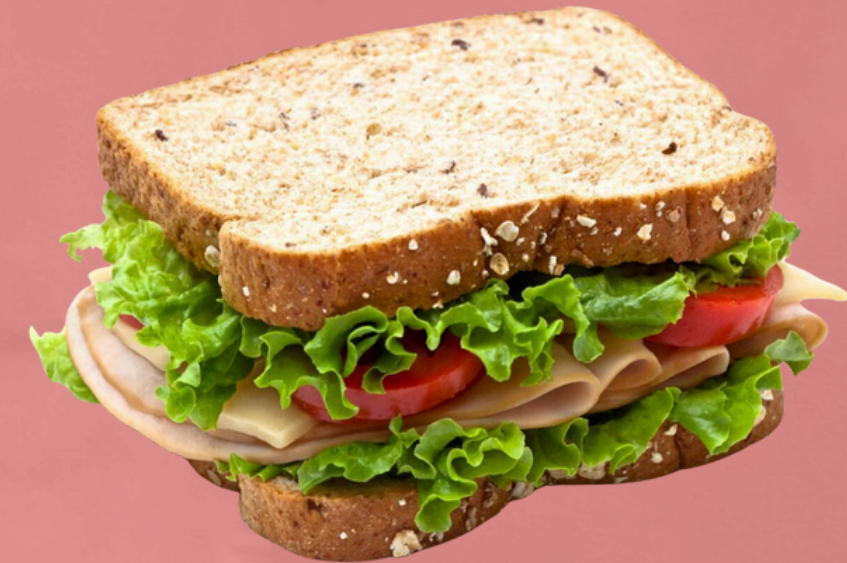
30-60 minutes after exercise

- 3-4: 1 RATIO (carbs : protein)
- 60-80 grams carbs: 20 grams protein
 - Snack ideas: Granola with yogurt, pretzels with hummus
 - Meal ideas: chicken with broccoli and rice, whole wheat bread with turkey slices lettuce and tomato



Every hour for 4 hours after event

- 1-1.2 g carbs/kg per hour



Sample Event Day of Eats

Morning event

7:00am	Meal 1 (before event)	Whole wheat wrap with banana and PB
9:00am	Snack 1 (during event)	Sports drink, watermelon
11:00am	Meal 2 (after event)	Chicken, brown rice, green beans
12:00pm	Snack 2 (after event)	Dried mango with crackers and cheese
1:00pm	Meal 3 (after event)	Oatmeal with berries and nuts
2:00pm	Snack 4 (after event)	High carb granola bar
5:00pm	Meal 4	Ground turkey taco bowl
7:30pm	Bedtime Snack 5	Yogurt with granola

Sampling Energy Balls

Contains no soy, gluten,
dairy, eggs, oats, tree
nuts, peanuts



Ingredients:

- 3/4 cup buckwheat flour
- 1 tsp vanilla
- 1/2 cup sunflower butter
- 1/3 cup honey
- 2 tablespoons flaxseeds
- 1/3 cup cranberries or chocolate chips

Direction:

- Combine all ingredients in a large mixing bowl
- Form into 1-inch balls
- Store in a container and store in the fridge for up to a week

Energy Balls

Contains no
soy, gluten,
dairy, eggs,
oats, tree
nuts, peanuts

Uncategorized

198 kcal • 4 g protein • 30 g carbs • 6 g fat

SunButter, Sunflower Butter, No Sugar Added

0.33

oz

61.39 kcal

Honey

0.04

cup

41.22 kcal

Buckwheat Flour

0.08

cup

33.27 kcal

Dried Cranberries

16

g

52 kcal

Jardi, Ground Flaxseeds

2

g

9.83 kcal

Breakfast

Lunch

Dinner

Snacks

Water

0 / 64 fl oz

Energy Summary

198 kcal

Consumed

3088 kcal

Burned

2002 kcal

Remaining

Targets

Energy

197.7 / 2200 kcal

9%

Protein

3.6 / 155.0 g

2%

Net Carbs

30.3 / 275.0 g

11%

Fat

6.4 / 53.0 g

12%

Sample Plate: Vegetarian



Vegetarian Protein Sources

Source	Serving	Protein (grams)
Lentils	1/2 cup cooked	9 grams
Beans (chickpeas, black beans, kidney beans, etc.)	1/2 cup	8 grams
Cottage cheese	1/2 cup	13 grams
Greek yogurt	1/2 cup	12 grams
Tofu	1/2 cup	11 grams
Edamame	1/2 cup	10 grams
Eggs	1 egg	7 grams
Peanut butter	2 tablespoons	7 grams
Seeds	2 tablespoons	8 grams

Reading a Nutrition Label

Important things to note:

- **Serving size**
- **Carbohydrate amount (grams)**
- **Protein amount (grams)**
- **Types of fat**
- **Sodium content**

1. Serving Information



2. Calories



3. Nutrients



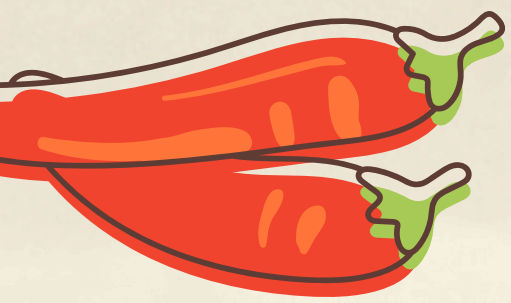
4. Quick Guide to percent Daily Value (%DV)

- 5% or less is **low**
- 20% or more is **high**

Nutrition Facts	
4 servings per container	
Serving size	1 cup (227g)
Amount per serving	
Calories	280
	% Daily Value*
Total Fat 9g	12%
Saturated Fat 4.5g	23%
Trans Fat 0g	
Cholesterol 35mg	12%
Sodium 850mg	37%
Total Carbohydrate 34g	12%
Dietary Fiber 4g	14%
Total Sugars 6g	
Includes 0g Added Sugars	0%
Protein 15g	
Vitamin D 0mcg	0%
Calcium 320mg	25%
Iron 1.6mg	8%
Potassium 510mg	10%
* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

Eating Well on the Road

- **Fruits and vegetables**
 - Whole fruit & veggies, juices, applesauce, raisins, V-8 juice
- **Grain-based foods**
 - Triscuits, graham crackers, pretzels, granola bars, dry cereal
- **Protein-rich foods**
 - Hard boiled eggs, string cheese, peanut butter, nuts, seeds, protein bars, tuna fish, hummus
- **Calcium-rich foods**
 - Yogurt, cottage cheese, milk, flavored milk, cheese sticks



Turning Convenience Foods into Meals

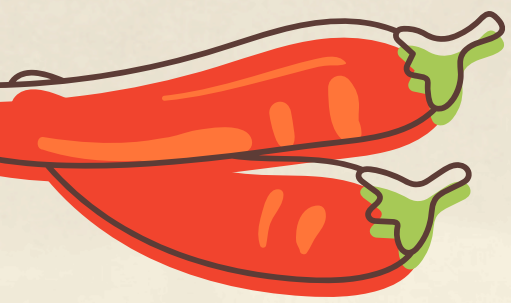
Orange juice + popcorn + protein bar + yogurt

Salsa+ corn chips + almonds + milk

Banana + peanuts + Wheat Thins + cheese sticks

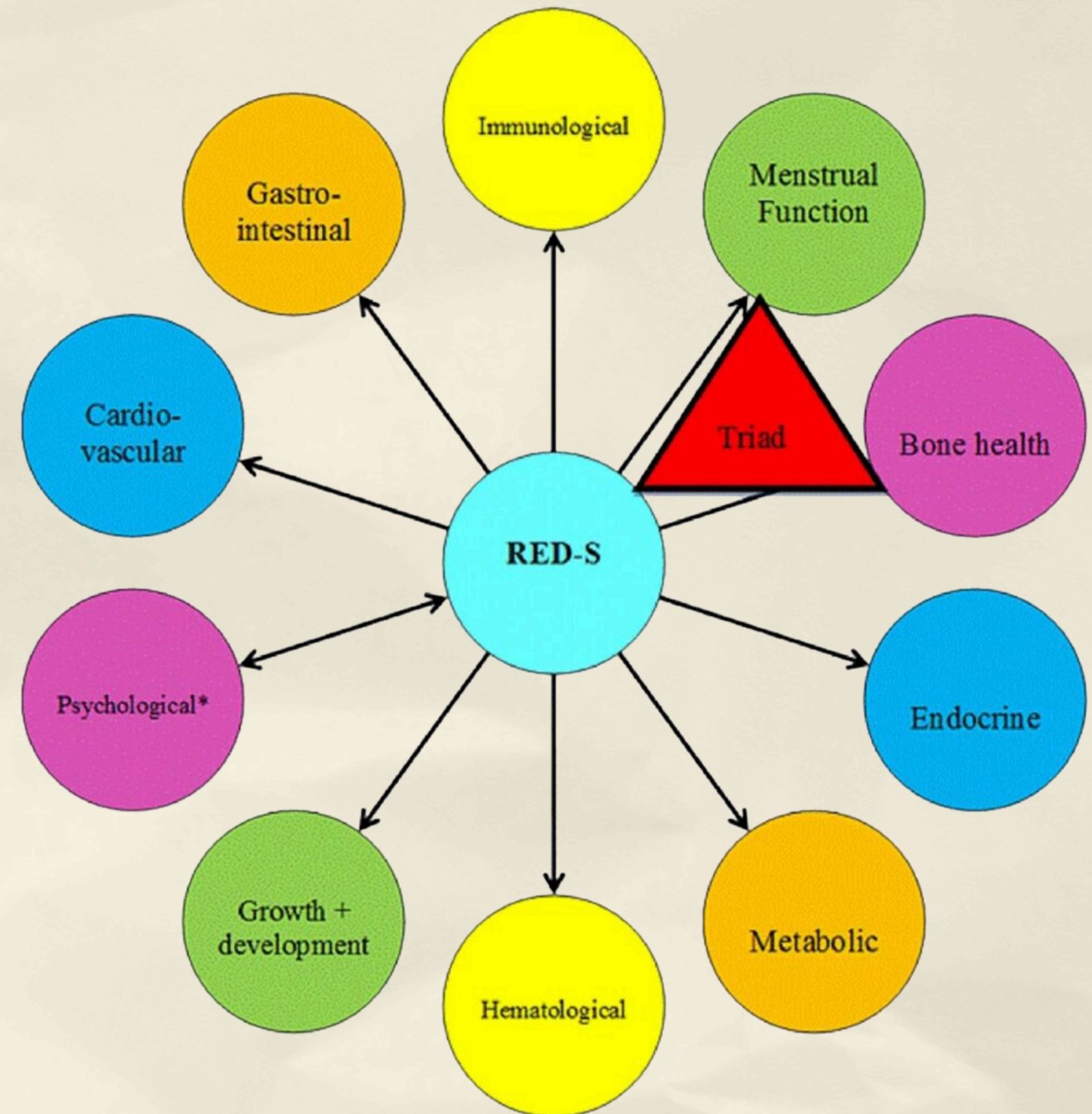
Mixed berries + yogurt + Triscuits + hard boiled egg

Cottage cheese + pineapple + graham crackers + milk



Relative Energy Deficiency in Sports

- A condition that occurs when athletes don't consume enough food to support their training
- Signs and symptoms: fatigue, weight loss, irritability, GI problems, absent or irregular menstrual cycles, training hard but not gaining strength



Choosing Safe Supplements

- Anti-doping: prohibiting illegal drug use to enhance athletic performance
- Dietary supplements are risky because they could contain prohibited substances that can cause a positive anti-doping test or ingredients that cause health problems.
 - Third Party Certification
- Your body prefers food vs. supplements



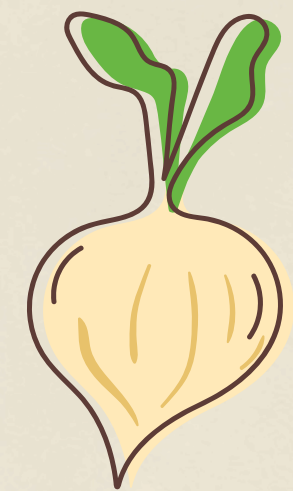
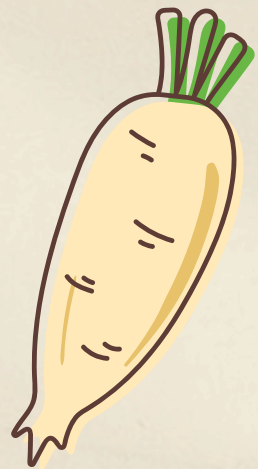
Choosing Safe Supplements

- **Drug Free Sport**
 - **www.drugfreesport.com**
- **World Anti-Doping Agency**
 - **www.wada-ama.org**
- **Supplement Safety Now**
 - **www.supplementsafetynow.com**
- **TrueSport of the U.S. Anti-Doping Agency (USADA)**
 - **www.usada.org/truesport**
- **Informed Choice**
 - **www.informedchoice.org**

Important Athlete Takeaways

- **Don't skip meals (aim for 3-4 meals/day)**
- **Snacking (2-3x/day)**
- **5 servings of fruits and veggies**
- **Eat protein throughout the day**
- **Low fiber, low fat before workouts**
- **High carb, moderate protein before workouts**

**No amount of training
will compensate for
being a poorly fueled
athlete.**



References

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