# Sport Nutrition

*Level 1*

A Publication of
**The Sport Medicine Council of Alberta**

# Section 1 – Introduction

- Established in 1983, the Sport Medicine Council of Alberta (SMCA) is a provincial, non-profit organization aimed to bring education and awareness to the different sport medicine disciplines in the province of Alberta.
- We are funded by the Alberta Government and the Alberta Sport, Recreation, Parks & Wildlife Foundation.
- We are governed by a board of directors and provide educational courses, research, programming and services to all Albertans to ensure their safe participation in sport and recreation activities.

Alberta

SMCA Sport Medicine Council of Alberta

Alberta Sport, Recreation Parks & Wildlife Foundation

# The Purpose of this Course

- To teach the basic concepts of nutrition as they relate to athletes.

- To teach the basic concepts of nutrition to improve sporting performance.

- To teach the critical thinking skills necessary to effectively identify and understand nutrition issues.

# Format of this Course

- This presentation is synchronized with the workbook: everything in the presentation and the order in which it is presented is replicated in the workbook.

- The workbook was designed to be as interactive as possible:

  – “Fill-in-the-blanks” to complete text in the workbook

- There are exercises and activities in this course: exercises will be completed in course, activities can be completed at home.

# Format of this Course Cont'd…

- Participants will be required to complete 1 day of diet records prior to the course: these records will be analyzed in the five "Diet Records" exercises.

- Included loosely with the workbooks are brochures and information sheets to provide participants with further information.

- In the appendix, there are blank copies of the hydration, nutrition, activity/sleep record logs so participants can continue to track their progress after the course.

# Record Keeping

- Increases YOUR awareness:
  - Foods and fluids
  - Activity
  - How you feel
  - Sleep

- Patterns become obvious

# Course & Workbook Outline

1. *Introduction*
2. *Hydrating the Athlete*
3. *Fueling the Athlete*
4. *Healthy Body Weights*
5. *Competition Nutrition*
6. *Appendix & Records*

Pages 1-5 & 1-6

# Personal Interview Questions

Exercise

***Please answer the 7 questions located on the next two pages your workbooks…***

***Keep your answers in mind as we work through the course.***

**“In endurance sports such as Eco-Challenge, good nutrition is the backbone and foundation to moving along and thinking clearly day after day.**

**To fuel your body properly and to have it run as efficiently as possible, knowing what to eat and when to eat is the difference between winning and losing.”**

Sara Ballantyne, representing Team Vail,
Winners of the 1998 Eco-Challenge Adventure Race

# Section 2 - Hydrating the Athlete

**Topics Addressed:**

- Water: The Essential Nutrient
- Athlete Hydration Status
- Dehydration
- Muscle Cramps
- Sweat Rates
- Sports Drinks
- Energy Drinks

# WATER: The Most Important & Often Neglected Nutrient

- Adequate hydration is crucial to athletic performance.

- Water makes up about 60% of our body weight.
- Water is the most essential nutrient for top athletic performance.

Exercise

# Athlete Hydration Program

***Refer to the chart in your workbook to determine whether your hydration program is on track:***

- 1 Serving = 1 cup (250 ml)
- Each Hydrating Fluid (Group A) is **+1**
- Each Dehydrating Fluid (Group B) is **-1**

## *Your Goal: A Score of +8*

# Why Hydrate?

- To replace water lost during exercise.
  - Helps regulate **core body temperature**.
  - Improves **performance** during physical activity.
  - Reduces the risk of **heat illness** and dehydration.

***The hydration status of the body is determined by the balance between water intake and water loss!***

# Dehydration

- Water is lost through **sweating, breathing and urinating**.
- Dehydration occurs when 1% of body weight is lost in water.
- Thirst mechanism = 2% dehydration.
- Exercise dulls thirst.
- Urine should be **clear & copious**.

# Symptoms of Dehydration

| % Wt. Lost | Wt. Lost* | Effect |
|---|---|---|
| 1% | 1.5 lbs | **Dehydration begins, impaired temperature control and exercise capacity** |
| 2% | 3.0 lbs | **Feeling of thirst, loss of appetite** |
| 3% | 4.5 lbs | **Increased pulse rate and body temperature** |
| 5% | 7.5 lbs | **Difficulty concentrating, headache, irritability, sleepiness** |
| 6% | 9.0 lbs. | **Increased respiratory rate, lower blood volume** |
| 9 % | 13.5 lbs. | **Heat exhaustion, heat stroke** |

***Based on a 150 lb. person**

**Adapted from: The SMCA Sports Nutrition Resource Manual, 2nd edition and The American Dietetic Association Sports Nutrition Manual 3rd Edition**

# Muscle Cramps

- Muscle cramps are often associated with dehydration but can also be related to **overexertion, fluid loss, inadequate conditioning** and **electrolyte imbalance**.
- Muscle cramps commonly occur in athletes who work their muscles to the point of exhaustion.
- Proper hydration, **stretching** and **massage** will help alleviate pain from cramping.

# Preventing Muscle Cramps

| Problem | Reason | Suggestion |
|---|---|---|
| **Water** | Coincides with dehydration | Drink plenty of water before, during & after exercise |
| **Calcium** | Plays an essential role in muscle contraction | Consume low-fat dairy products at least twice a day. |
| **Potassium** | Electrolyte imbalance may play a role in muscle cramps | Eat potassium-rich foods: focus on fruits and vegetables |
| **Sodium** | Low-sodium diets or sodium imbalance from exercising in the heat for long durations | Snack on salted pretzels and sports drink during exercise |

# Sweat

- Perspiration or sweat is the body's method of cooling itself.
- Excess heat produced by metabolism or **working muscles** is removed when sweat **evaporates** from the surface of your skin.
- Sweat consists mostly of water but has high amounts of **chloride** and **sodium.**
- Sweating can occur from **exercise**, hot **air temperature** or **nerve stimulation.**

# Sweat Rates

- Vary depending upon:
  - **Duration** and **intensity** of exercise.
  - **Environmental** conditions (eg. Hot, cool, dry, moist, elevation.)
  - Degree of **acclimatization**
  - <u>Clothing</u>

***Why does 'degree of acclimatization' affect sweat rates?***

Activity

# Calculating Sweat Rates

***The purpose of this activity is to determine what your fluid intake should be during exercise to prevent dehydration in the future.***

***Use the chart on page 2-7 to track information required to calculate future sweat rates.***

# Prevention is the Best Cure!

## *Factors that Encourage Fluid Intake:*

- Water bottle to maximize **your** fluid intake.
- Easy **access**
- **Temperature** of fluid
- Flavoured

***What can you do to improve your fluid intake??***

# Sports Drinks

- Provide a source of fluid, **carbohydrates** and **electrolytes**.
- Delivers **sugars** to working muscles during vigorous and prolonged **exercise** lasting between 45 – 60 minutes.
- Rehydrates body and replenishes **blood** glucose which delays **dehydration** and **fatigue**.

# Composition of Sports Drinks

- Water (92-94% by volume)
  - **Rapid absorption**

- Carbohydrates (6-8% by volume)
  - **Energy source preferred by working muscles**
  - **Improves taste – increases desire to drink**

- Sodium & Potassium
  - **Replace electrolytes lost in sweat**
  - **Increased desire to drink**

***Activity: Make your own Sports Drink at Home***

# Energy Drinks

- Energy drinks contain **large quantities** of caffeine and sugar:
  - One Energy Drink has 3x the amount of caffeine as a **can of Coke**.
  - One Energy Drink is equivalent to a cup of strong coffee with 5 tsp. of **sugar**.

# Energy Drink Consumption

- **Energy Drink consumption can lead to:**
  - Rise in Blood Pressure
  - Decreased Sleep
  - Heightened Anxiety
  - Dehydration
- **Energy Drinks should not be consumed by:**
  - Pregnant Women
  - Children
  - Those participating in intense exercise

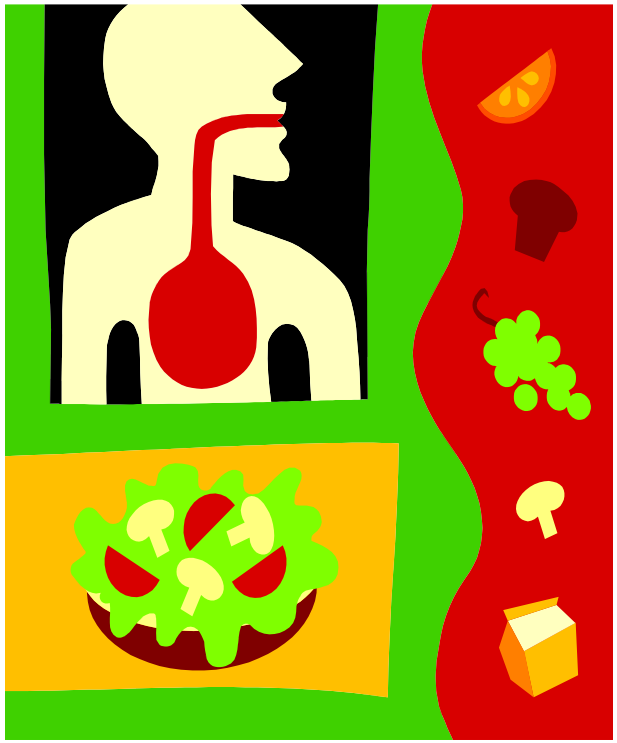
# Energy Drinks & Physical Activity

***Energy Drinks are not appropriate before or during physical activity because:***

- High sugar content is **not balanced** with electrolytes to help promote water **absorption** during exercise.
- They are dehydrating which leads to **increased fatigue** and **decreased athletic performance.**

*Energy Drink information from Dr. Justine Turner, M.D.*

# Section 3 – Fueling the Athlete



## Topics Covered:

- Calories
- Personal Daily Caloric Req.
- Canada Food Guide
- Serving Sizes
- Functions and Sources of:
  - Carbohydrates
  - Fats
  - Proteins
- Vitamins and Minerals
- Nutrition Tour

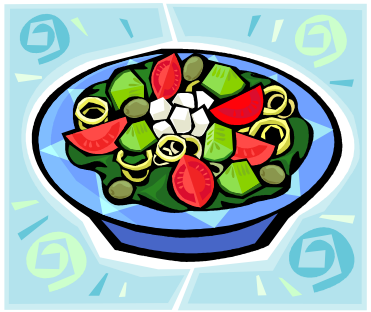
***“A good diet does not make an average athlete great, but a poor diet can make a great athlete average.”***

- Dr. David Costill (Exercise Physiologist)

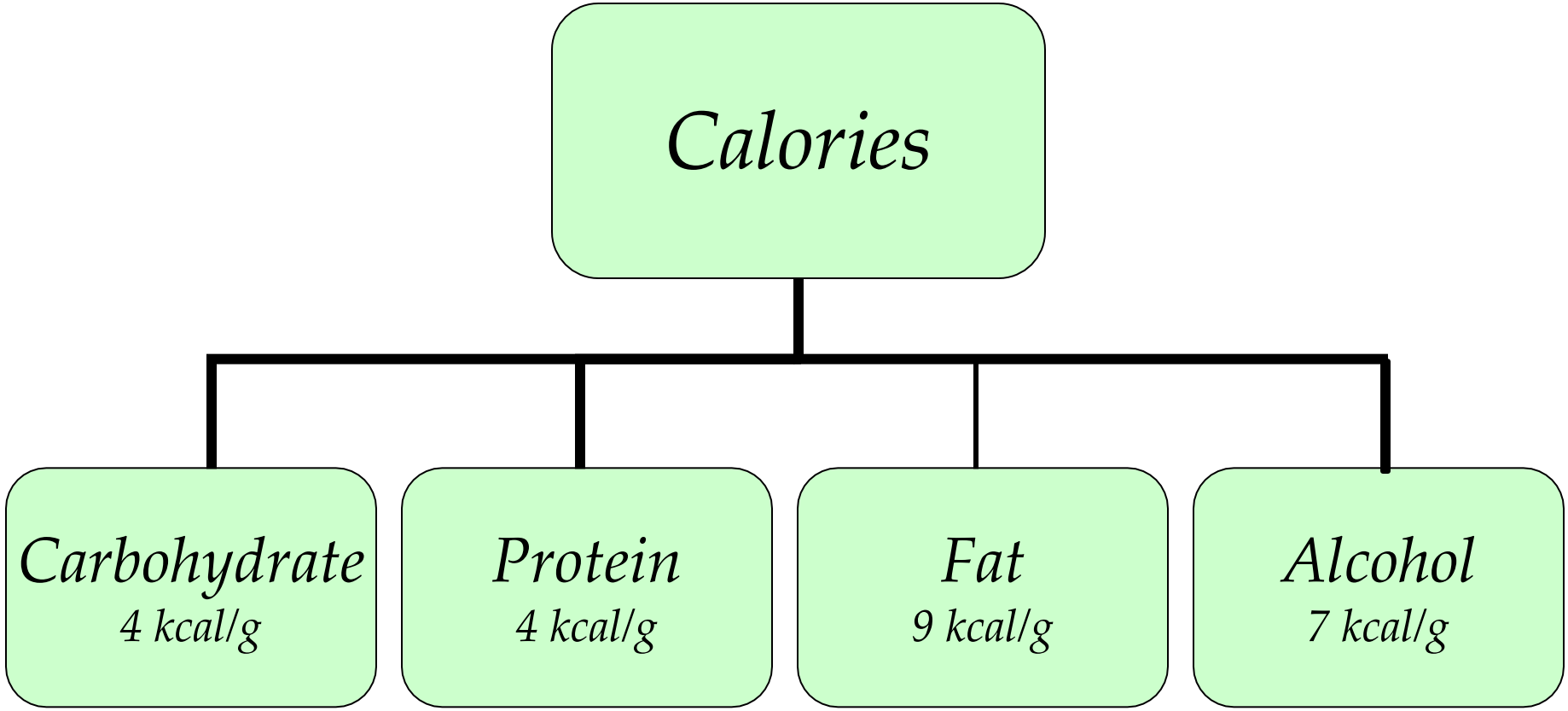
# What is a Calorie?

- A **calorie/kcal** is a measurement of energy:
  - We consume calories in food.
  - We expend calories during **activity** and to maintain **normal body function**.

***Where do Calories Come From?***



# Where Calories Come From:



# How Many Calories you Need Each Day Depends on Your:

- Age
- Height
- Weight
- Gender
- Amount of body muscle
- Amount of daily physical activity

Pages 3-2, 3-3 & 3-4

Exercise

# Calculate YOUR Personal Daily Caloric Requirements

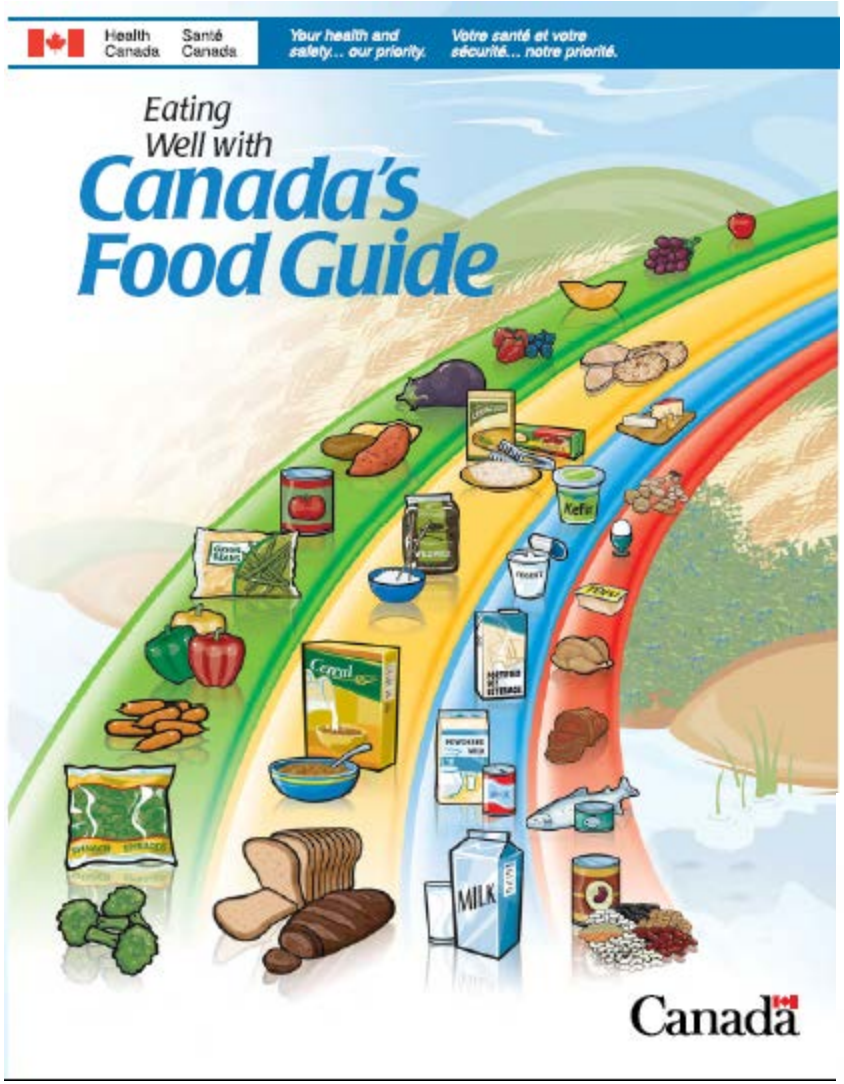
***Follow the instructions in your workbook to calculate the number of calories you need to fuel an average day's activities.***

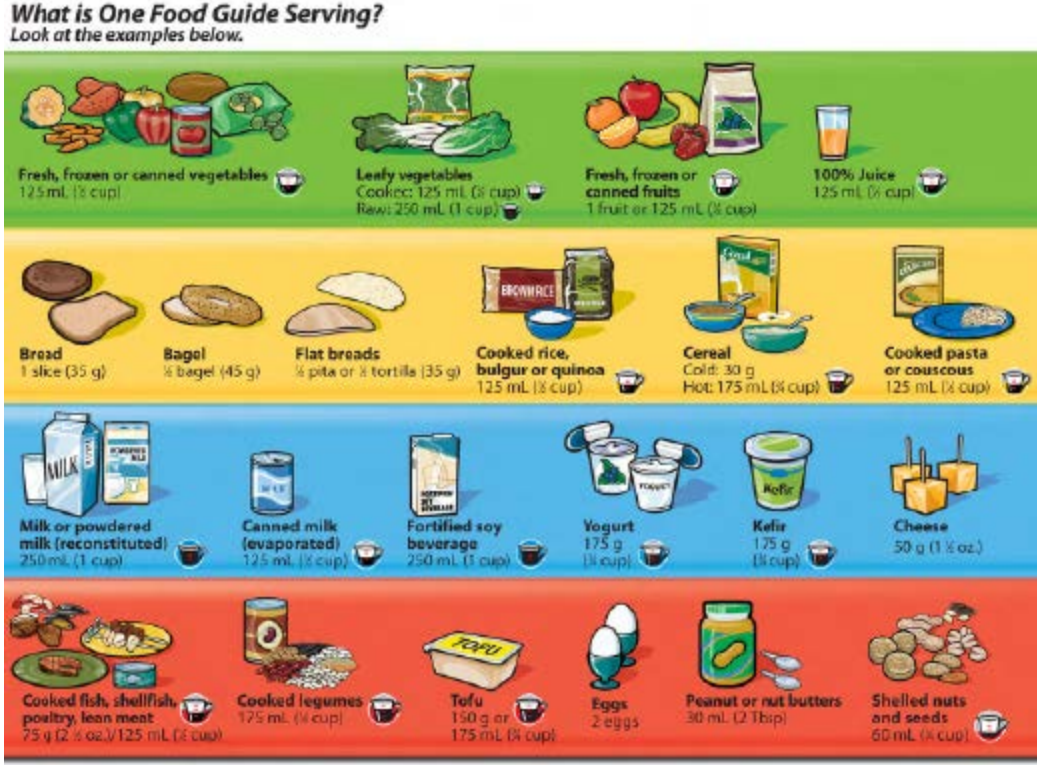
Step 1 **Determine Resting Metabolic Rate. (RMR)**

Step 2 **Figure Out Daily Activity Level.**

Step 3 **Calculate the amount of calories burned during Purposeful Exercise.**

Step 4 **Determine Total Calorie Requirement.**


Health Canada
Santé Canada
Your health and safety... our priority.
Votre santé et votre sécurité... notre priorité.
Eating Well with
Canada's Food Guide
Canada


What is One Food Guide Serving?
Look at the examples below.
Fresh, frozen or canned vegetables
125 mL (½ cup)
Leafy vegetables
Cooked: 125 mL (½ cup)
Raw: 250 mL (1 cup)
Fresh, frozen or canned fruits
1 fruit or 125 mL (½ cup)
100% Juice
125 mL (½ cup)
Bread
1 slice (35 g)
Bagel
½ bagel (45 g)
Flat breads
½ pita or ½ tortilla (35 g)
Cooked rice, bulgur or quinoa
125 mL (½ cup)
Cereal
Cold: 30 g
Hot: 175 mL (¾ cup)
Cooked pasta or couscous
125 mL (½ cup)
Milk or powdered milk (reconstituted)
250 mL (1 cup)
Canned milk (evaporated)
125 mL (½ cup)
Fortified soy beverage
250 mL (1 cup)
Yogurt
175 g
(¾ cup)
Kefir
175 g
(¾ cup)
Cheese
50 g (1 ½ oz.)
Cooked fish, shellfish, poultry, lean meat
75 g (2 ½ oz.)/125 mL (½ cup)
Cooked legumes
175 mL (¾ cup)
Tofu
150 g or 175 mL (¾ cup)
Eggs
2 eggs
Peanut or nut butters
30 mL (2 Tbsp)
Shelled nuts and seeds
60 mL (¼ cup)

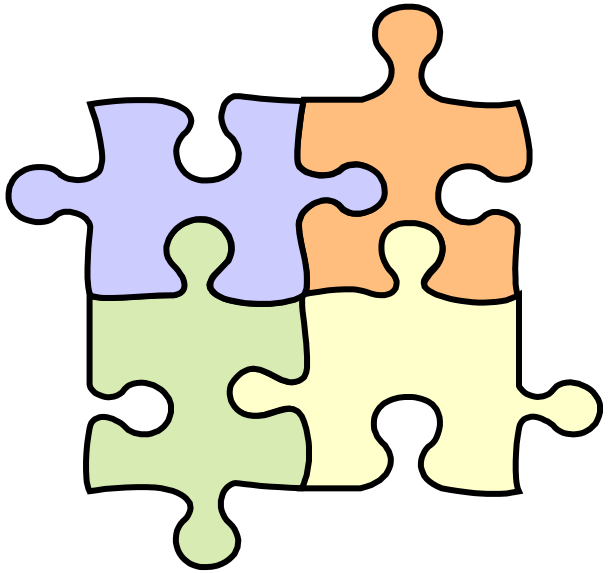

Enjoy a variety of foods from the four food groups.


Satisfy your thirst with water!
Drink water regularly. It's a calorie-free way to quench your thirst. Drink more water in hot weather or when you are very active.

# Canada Food Guide Principles

## Key Concepts:

- Enjoy a VARIETY of foods.
- Emphasize **vegetables** & **fruits**.
- Choose lower-fat dairy products, **leaner meats** and foods prepared with little or no fat.
- Limit salt, **alcohol** and **caffeine.**



**Make wise choices:** *not only for overall health, but for optimal sporting performance!*

# Servings & Serving Sizes

- **How much food do you need everyday?**
  - Not everyone has the same food requirements.
  - Refer to your Canada Food Guide for a chart on food needs for different ages and genders.

| Eg. Food Requirements for 35 year old woman | |
|---|---|
| Grain Products | 6 – 7 servings |
| Fruits & Vegetables | 7 – 8 servings |
| Milk & Alternatives | 2 |
| Meat & Alternatives | 2 |
| Unsaturated Oils & Fats | 30 – 45 mL |

*Example taken from the Health Canada Food Guide Website: http://www.hc-sc.gc.ca*

Page 3-6 & 3-7

# Serving Size Comparisons

- **What is a food guide serving?**
  - Refer to your Canada Food Guide for an example on how to count servings in a meal
  - Refer to the chart on page 3-6 for comparing food guide servings to real life objects.

***Activity:***
***Getting to know the NEW Canada Food Guide***

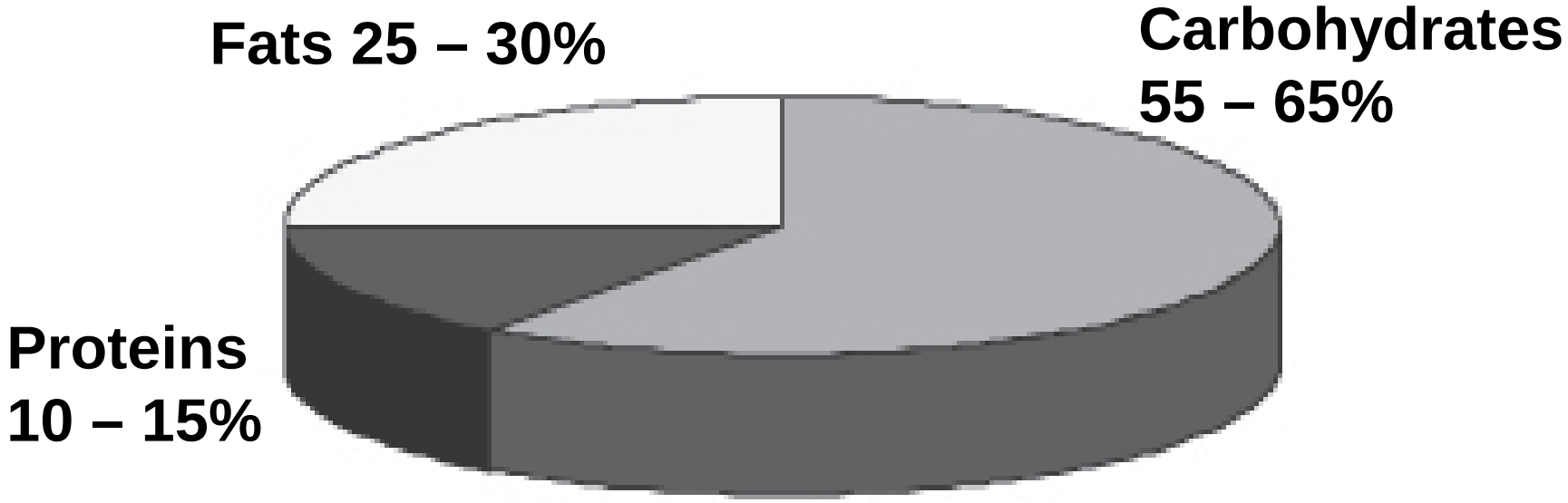
Exercise

# Diet Records # 1
# Serving Sizes

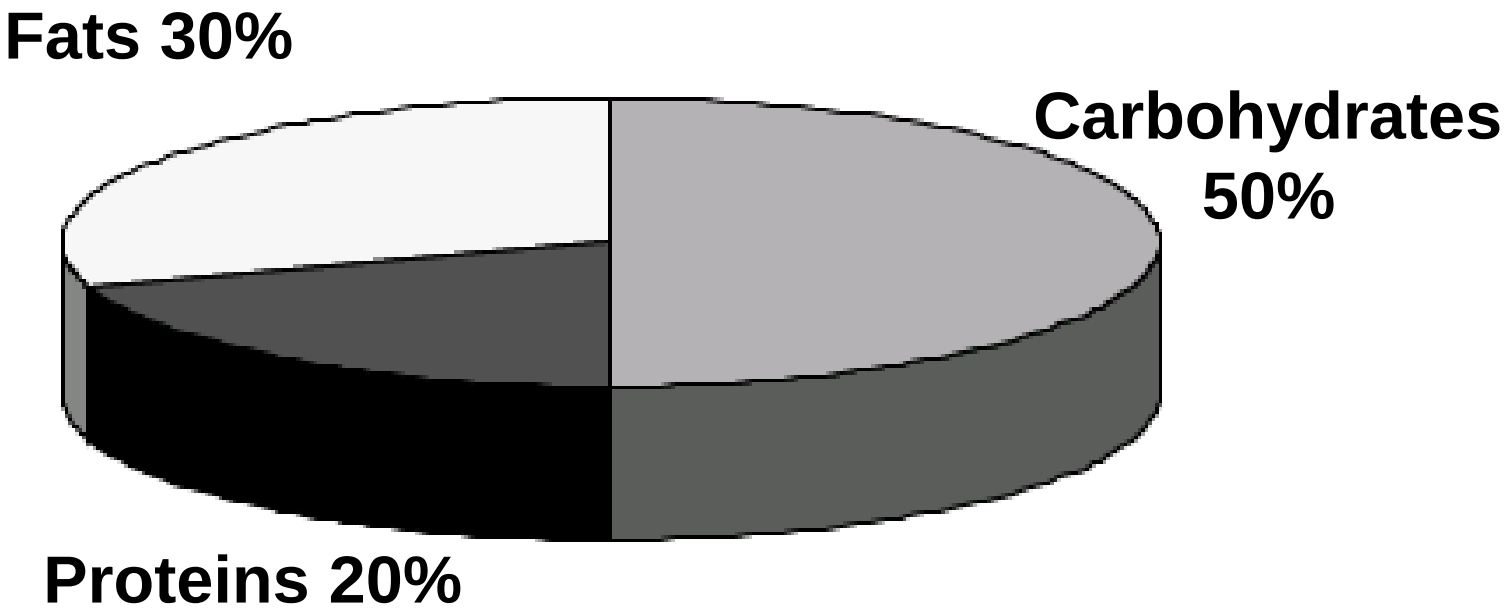
***The purpose of this exercise is to determine how many servings of food you are consuming from each food group and how it compares to your Personal Daily Caloric Intake.***

1. Retrieve your diet record.
2. Using the CFG and the chart on page 3-6 of your workbooks, convert the food you consumed into servings.
3. Record the servings in the right hand column of your diet records and total on the bottom.
4. Compare the number of servings you consumed with your personal daily caloric intake value.

# Healthy Eating



# Healthy Eating for Youth/Adolescents




***Why do adolescents need more protein?***

**Because they are growing.**

# Carbohydrates

# Carbohydrates (CHO)

- **Preferred source of energy** for the muscles and brain.
- The easiest way to **increase carbohydrates** is to add more **grain products**, vegetables and fruits to your diet.

***1 gram Carbohydrate = 4 calories***

# Healthy Sources of Carbohydrates

## 1. Grains:

- Wholegrain

## 2. Vegetables and Fruits:

- Colours

## 3. Dairy Products:

- % MF or % BF

## 4. Meats and Alternatives:

- Legumes (Dried Peas, Beans & Lentils)

# Glycogen

- The **stored form** of glucose found in **liver** and the muscles.
- Exercise **depletes glycogen stores**.
- **Glycogen storage capacities vary**: the fitter you are, the greater your storage capacity.

***Aerobic training and diet improvements greatly increases the amount of glycogen stored in the muscle!***

# Two Types of Carbohydrates

1. Simple Carbohydrates are **sugars**.
   - **digested and absorbed quickly for immediate use as energy.**

**Eg.** Vegetables & Fruit
Milk Products
Extras

***When might an athlete consume simple carbohydrates?***

During activity or immediately after for a quick burst of energy.

# Types of Carbohydrates Cont'd

2. Complex Carbohydrates are **starches** and **fibres**.
   - **slowly digested and absorbed into the bloodstream.**

   **Eg.** Grain Products

   Meat & Alternatives

***When might an athlete consume complex carbohydrates?***

2-4 hours before or immediately after an activity to add to/restore energy.

Exercise

# Diet Records - #2

***Use your diet record and the chart on page 3-6 of your workbooks to answer the following questions:***

1. How many choices from grain products did you have each day?

2. How many vegetable and fruit products did you have each day?

3. How do your daily servings of Grain Products & Vegetables & Fruits compare to the recommendations of the Canada Food Guide?

# The Digestion of Carbohydrates

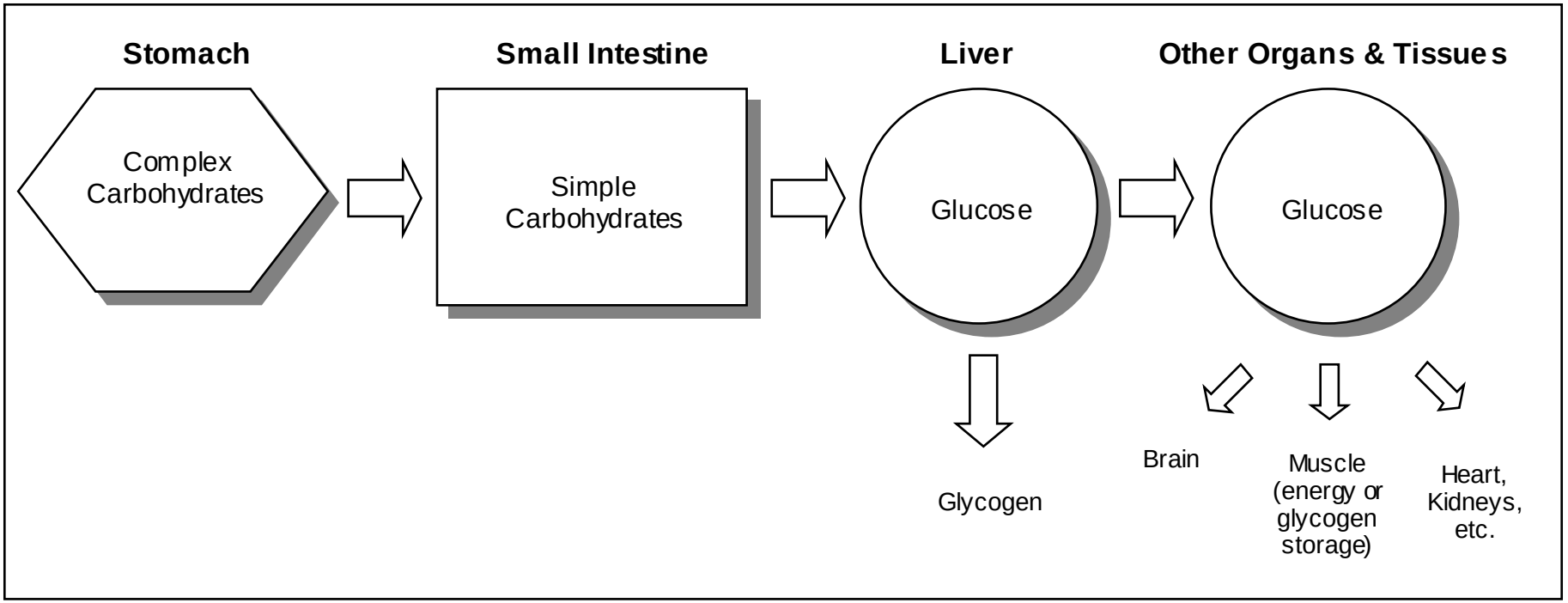
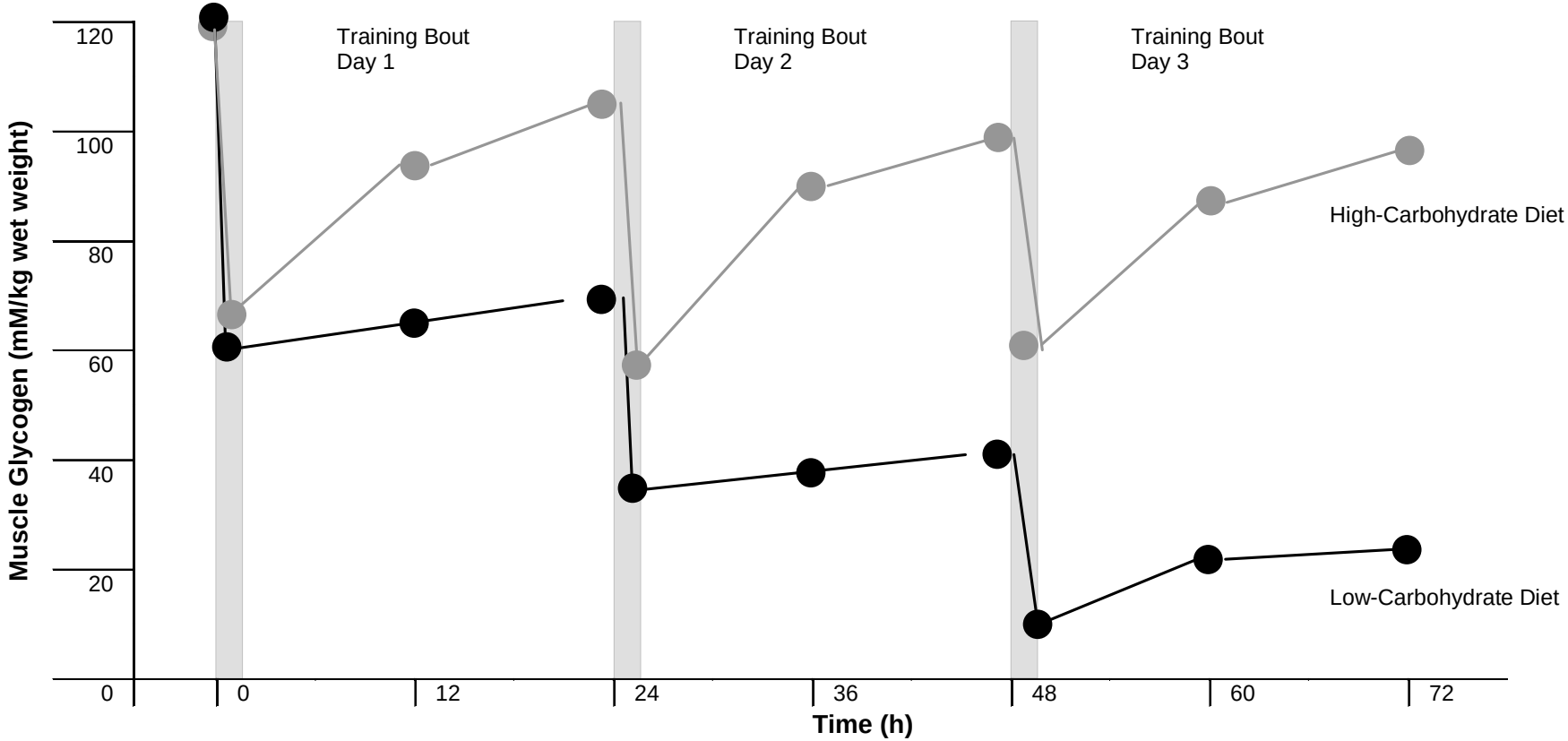



*Chart from pg. 18 Sports Nutrition Resource Manual, 2nd Edition.*

# Effects of Diet on Muscle Glycogen Stores




Effects of diet on muscle glycogen content during three successive daily 2-hour bouts of heavy training. Caloric compositions of diets were as follows: low-carbohydrate diet, 40% of total calories from carbohydrate; high-carbohydrate diet, 70% of total calories from carbohydrate. (Adapted from Costill DL, Miller JM: Nutrition for endurance sport: Carbohydrate and fluid balance. Int J Sports Med 1:2-14, 1980.)

*Chart from pg. 23 Sports Nutrition Resource Manual, 2nd Edition.*

# Sample Meal Plan 3000 Calorie

***50% Carbs***

***Vs.***

***70% Carbs***

## Sample Meal Plans

***For a 3000 Calorie Diet***

| *Regular Diet (50% Carbohydrates)* |
|---|
| **Breakfast:**<br>• 250 mL (1 cup) 2% milk<br>• 125 mL (1/2 cup) juice<br>• 10 mL (2 tsp) butter/margarine<br>• 2 slices of toast<br>• 250 mL (1 cup) dry cereal<br>• 15 mL (3 tsp) jam, jelly, honey, or sugar |
| **Morning Snack:**<br>• 1 apple or 250 mL (1 cup) juice |
| **Noon Meal:**<br>• 250 mL (1 cup) 2% milk<br>• Tossed salad<br>• 15 mL (1 Tbsp) Dressing<br>• Sandwich<br>- 2 slices of bread<br>- 75 g (3 oz) meat<br>- 5 mL (1 tsp) butter/margarine<br>• 250 mL (1 cup) stock soup<br>• 250 mL (1 cup) Fruit Salad |
| **Afternoon Snack:**<br>• Banana |
| **Evening Meal:**<br>• 250 mL (1 cup) 2% milk<br>•250 mL (1 cup) cooked vegetable<br>• Tossed salad<br>- 15 mL (1 Tbsp) dressing<br>- 500 mL (2 cups) potato, rice, or pasta<br>- 5 mL (1 tsp) butter/margarine<br>- 75 g (3 oz) meat, fish, or poultry<br>• Fruit crisp |
| **Evening Snack:**<br>• 250 mL (1 cup) juice<br>• 6 plain biscuits |

| *Very High Carbohydrate Diet (70% CHO)* |
|---|
| **Breakfast:**<br>• 250 mL (1 cup) 2% milk<br>• 250 mL (1 cup) juice<br>• 5 mL (1 tsp) butter/margarine<br>• 3 slices of toast<br>• 250 mL (1 cup) dry cereal<br>• 15 mL (3 tsp) jam, jelly, honey, or sugar |
| **Morning Snack:**<br>• 2 apples or 500 mL (2 cups) juice |
| **Noon Meal:**<br>• 250 mL (1 cup) 2% milk<br>• Tossed salad<br>- no dressing: use vinegar or lemon instead<br>• Sandwich<br>- 2 slices of bread<br>- 50 g (2 oz) meat<br>- 5 mL (1 tsp) butter/margarine<br>• 250 mL (1 cup) stock soup<br>• 6 saltines or 1 roll<br>• 250 mL (1 cup) Fruit Salad |
| **Afternoon Snack:**<br>• Banana<br>• 250 mL (1 cup) Juice |
| **Evening Meal:**<br>• 250 mL (1 cup) 2% milk<br>• 250 mL - 500 mL (1-2 cups) cooked vegetable<br>• Tossed salad<br>- no dressing: use vinegar or lemon instead<br>- 625 mL (2 1/2 cups) potato, rice, or pasta<br>- 5 mL (1 tsp) butter/margarine<br>- 75 g (3 oz) meat, fish, or poultry<br>• Fresh or canned Fruit |
| **Evening Snack:**<br>• 500 mL (2 cups) juice<br>• 6 plain biscuits |

# Fibre

- Indigestible part of carbohydrates.
- Helps **reduce** the risk of some **heart diseases** and cancers.
- Helps **regulate body weight**:
  - Decreases the risk of Type 2 diabetes
- Prevents constipation.

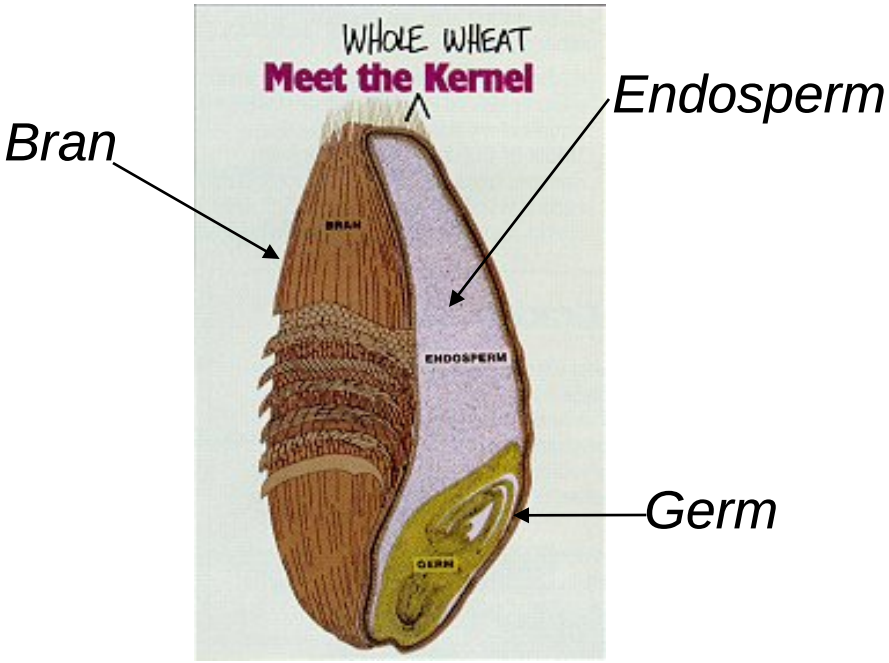



*Illustration from: Nutrition Action Health Letter, Centre for Science*
*http://www.cspinet.org/nah/wwheat.html*

# Two Types of Fibre

1. Soluble Fibre
   - Oats & oat bran
   - Dried peas, beans, lentils
   - Vegetables & fruits
- Slows the **absorption** of food into the body.
- Helps reduce cholesterol.

2. Insoluble Fibre
   - Wheat bran, whole grains (wheat, rye, etc.) & rice
   - Vegetables and fruits with skins
- Provides roughage which **pulls water into the large intestine.**
- Reduces constipation.

***Remember: if are trying to increase the fibre in your diet, do it slowly… and increase your fluid consumption.***

***Fibre without Water = CONCRETE!***

# Fibre Recommendations

- The average Canadian consumes 10-20 g of fibre/day.
- Bottom Line: We all need to consume more fibre.

| Demographic | Age (years) | App. Daily Rec. Intake (g) |
|---|---|---|
| **1. Children** | Less than 1 year<br>1 to 3<br>4 to 8 | Levels not determined<br>19 g<br>25 g |
| **2. Males** | 9 to 13<br>12 to 50<br>50 to > 70 | 31 g<br>38 g<br>30 g |
| **3. Females** | 9 to 13<br>12 to 50<br>50 to > 70 | 26 g<br>25 g<br>21 g |
| **4. Pregnancy** | < 18<br>19 to 50 | 28 g<br>28 g |
| **5. Lactation** | < 18<br>19 to 50 | 29 g<br>29 g |

*Information retrieved from Dietrary Reference Intakes on the National Academies Press website: www.nap.edu.*

Exercise

# Fibre & Athletes

- Why is high fibre intake important for athletes?
- When should athletes consume foods high in fibre and why?
- When shouldn't athletes consume foods high in fibre and why?

***Refer to the "Fibre Scoreboard" on pgs. 3-16, 3-17 & 3-18 and the High Fibre Foods Chart on pg. 6-4.***

# Fats

# Functions of Fat in the Body

- **Fuel** for health and athletic performance:
  - A major storage site for energy.
  - Humans have an **unlimited** capacity to store fat
- **Carbohydrate and fat both needed as energy sources:**
  - Moderate intensity, long duration.
- **Carrier** of **fat** soluble **vitamins** – Vitamins A, D, E & K.
- Serves as **shock absorber** and **protective shield** for the heart, brain and internal organs.

***1 gram Fat = 9 calories***

# Fat Comparison

Apple (50 cal) **vs.** tsp of Butter (50 cal)

***Which is more nutrient dense??***

# Types of Fats & How They Relate to Health

## Fats That Clog Arteries:

**Saturated Fats**
- Solid at room temperature
- Animal Fats
- e.g Meat, Butter, Lard, Palm & Coconut Oil

**Trans Fats**
- Produced by hydrogenation
- Found in hard margarine, shortening, and many deep fried and processed foods

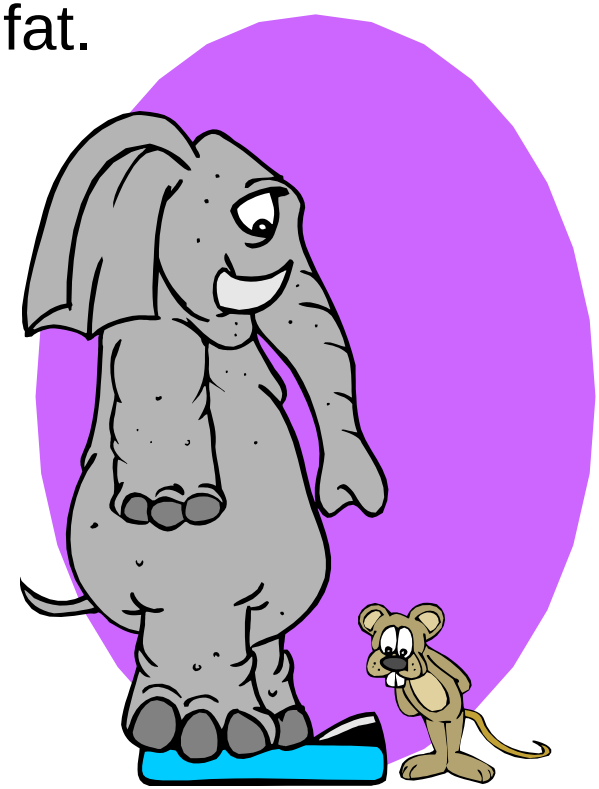
Hydrogenation

## Better Fats

**Unsaturated Fats**
- Liquid at room temperature
- Plant Fats
- e.g Canola, Olive & Corn Oil

# Fat & Exercise

- **Limit intake of fat** to 20 – 35% of daily calories.
  - Young athletes need about 25 – 35% fat.
- Ultra low-fat diets:
  - Less than 20% of calories from fat.
  - **Not recommended for athletes.**
- Conversion of fat to energy is **S L O W…**
  - **Cannot sustain intense activity.**



Exercise

# Recommended Daily Fat Intake

***The purpose of this exercise is to determine the amount of fat you should be consuming on a daily basis for optimal health. To complete the exercise, follow the instructions in your workbook.***

## *Remember:*

- 1 tsp. Fat = 5 grams
- Choose “better fats” to fulfill daily intakes (refer to chart on page 3-20 of workbooks)
- Read food labels carefully

# Proteins

# Protein in the Body

- Proteins are found everywhere in the body:
  - **Muscles, bones, tendons, ligaments, blood cells.**
- Proteins are composed of **building blocks** called amino acids.
- The **primary role of protein** is to maintain and repair all the body's **cells** and **tissues**.

***1 gram Protein = 4 calories***

***Which food groups contain the most protein?***

Hint: Refer to the Canada Food Guide.

# Protein Needs Vary Depending on Age & Activity Level

**Protein needs are slightly higher for**:

- Adolescent athletes.
- Athletes who are restricting calories.
- **Endurance & strength-training** athletes.

# Types of Protein

1. <u>Complete</u> Protein
   contains all essential amino acids.

   Eg. – Eggs, meat, fish, poultry & milk products.

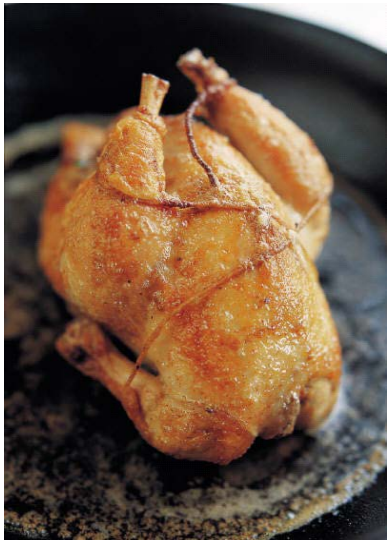
2. <u>Incomplete</u> Protein is **missing one or more** essential amino acids.

   Eg. – grains, soy, beans, lentils, nuts & seeds.

Exercise

# Protein Content of Selected Foods

**1. Classify the foods listed in the chart as either “Complete” or “Incomplete” Sources of Protein.**



# Complementary Proteins

Mixing of **two incomplete proteins** to provide all the essential amino acids.

- **Grains & Milk Products**
  - Cereal and milk
  - Pasta and cheese
  - Graham wafers and yogurt
  - Peanut Butter & Toast

- **Grains & Dried Peas, Beans & Lentils**
  - Rice and beans
  - Corn bread and vegetarian chili
  - Whole grain bread and baked beans


*From Nancy Clark's Sport Nutrition Guidebook, 3rd Edition*

# Sample Protein Needs

- For a 70 kg (154 lbs.) Active Adult:

| Food Choice | Protein Content | Food Group Eg. |
|---|---|---|
| 1 Cup (250 ml) Cereal | 4 grams | 2 grains |
| 1 Cup (250 ml) Cold Milk | 8 grams | 1 milk & alternatives |
| 2 Tbsp (30 ml) Peanut Butter | 7 grams | 1 meat & alternatives |
| 1 Apple | 2 grams | 1 fruit & vegetables |
| 3 oz. (90 g) Smoked Salmon | 21 grams | 1 meat & alternatives |
| 3 Slices Toast | 6 grams | 3 grains |
| 3 oz (90 g) Hamburger Patty | 24 grams | 1 meat & alternative |
| 2 oz (50 g) Cheese | 14 grams | 2 milk & alternatives |
| 1 Hamburger Bun | 4 grams | 2 grain |
| 1 potato | 3 grams | 1 fruit & vegetables |
| **TOTAL:** | **84 grams** | |

*p. 46, Sports Nutrition Resource Manual, 2nd edition*

Exercise

# Diet Records - #3

***Use your diet record to answer the following questions:***

1. How many protein products did you have each day?

2. How does your portion size compare to that suggested in the CFG?

3. Are you consuming more or less than the CFG?

4. Were you eating Complementary Proteins? If so, which ones?

# Digestion of Protein

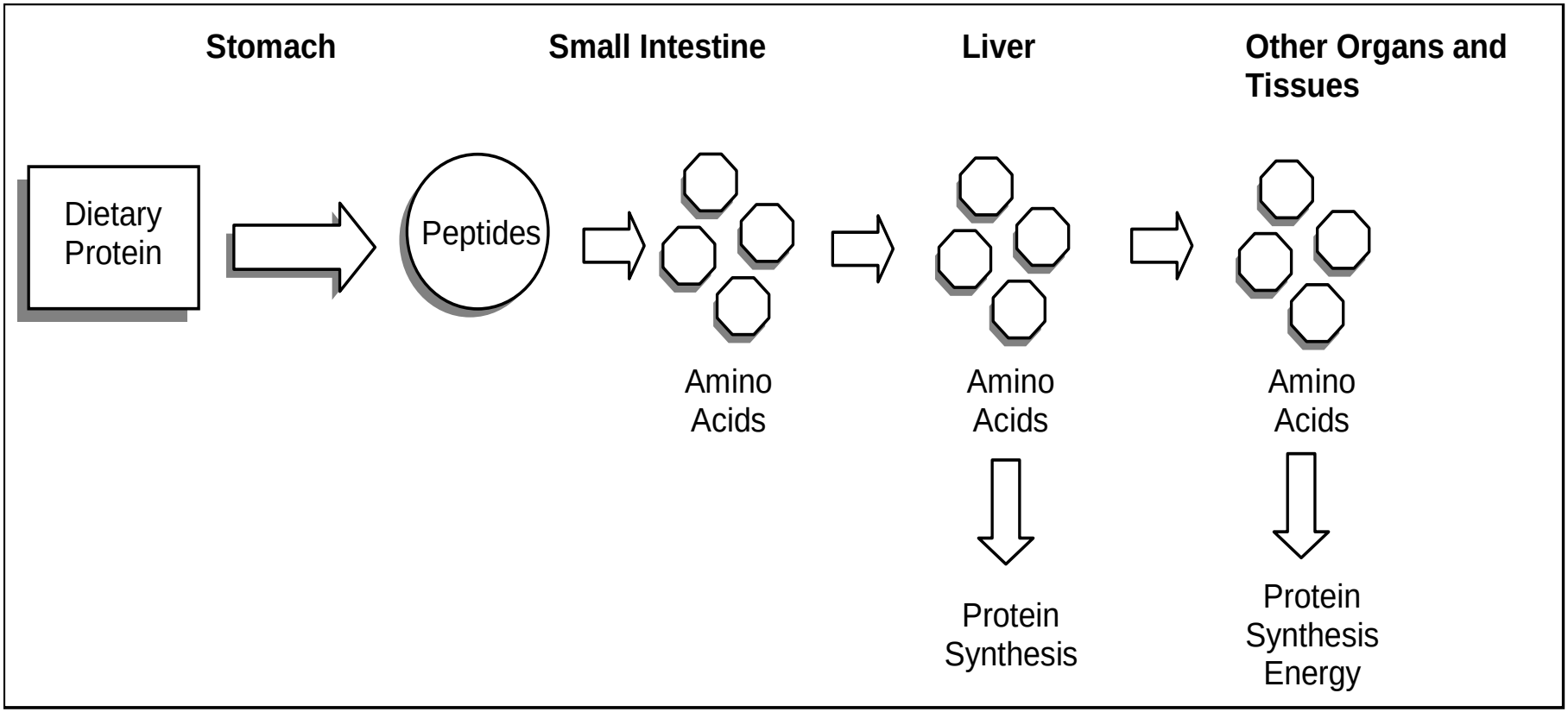



*Chart from pg. 42 Sports Nutrition Resource Manual, 2nd Edition.*

# Protein as an Energy Source?

- Protein **can** be used as an energy source if carbohydrates and **caloric intake** are **insufficient.**
- Proteins are a very inefficient **energy source**.
- The body prefers to use carbohydrates as its energy source:
  - More efficient and “cleaner burning fuel.”
- About 10 – 15% of our total calories should be from **protein foods**.
- For **young athletes**, 20% of calories should be from protein.

# Protein Supplements

- **Not necessary**: benefit is usually from the **extra calories**, not the protein itself.
- **EXPENSIVE**!!!
- No regulations:
  - Inconsistent ingredients
  - Banned substances

**For more information on supplements, please refer to the Canadian Centre for Ethics in Sport (CCES) website: www.cces.ca**

# Vitamins & Minerals

- Essential for health and growth.
- Vitamins
  - Water Soluble
    - Vitamin B's & C
  - Fat Soluble
    - Vitamin's A, D, E & K

# Vitamins & Minerals

- Delicate balance
  - High doses of individual vitamin and/or mineral supplements **ARE NOT** recommended.
  - Supplements **ARE NOT** food replacements.

- Include a **variety of foods** from the CFG to obtain all essential vitamins and minerals.

- The three major minerals important to athletes: CALCIUM, IRON & ZINC.

***Whole foods are greater than the sum of their parts.***

***Refer to the Vitamin & Minerals Charts on pages 3-29 & 3-30.***

# Calcium for Athletes

- Major component of the bones and teeth.
- Also needed for muscle **contraction** and **blood clotting**.
- Groups at risk of insufficient calcium intake:
  - Athletes in appearance-based **sports.**
  - **Long distance** runners.

***Refer to the Calcium Brochure and Calcium Chart on pg. 6-4 for more info.***

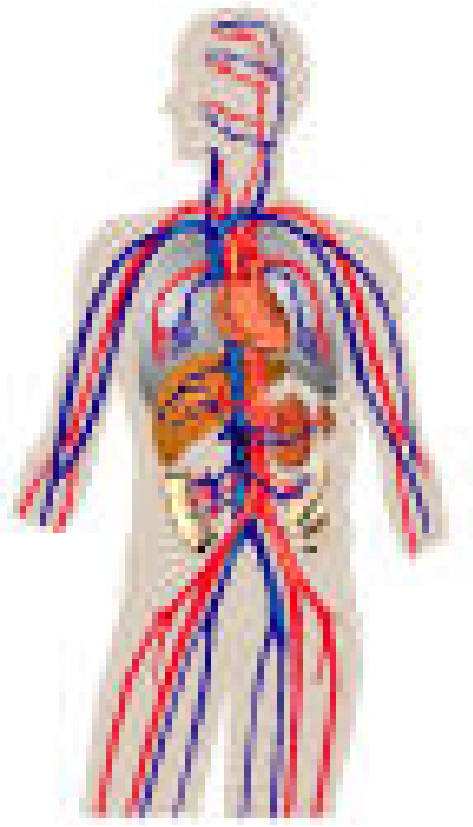
# Calcium Intakes

- Adequate calcium is important throughout the lifecycle.
- Maximum absorption is 400 – 500mg Calcium at a time.
- **1 serving of Milk Products** provides 300 – 350mg of Calcium.

| Age (years) | Adequate Intake (mg) |
|---|---|
| 4-8 | 800 |
| 9-18 | 1300 |
| 19-50 | 1000 |
| 51-70 | 1200 |
| 70+ | 1200 |
| Pregnancy + Lactation | Same as AI for Appropriate Age |

*Chart from pg. 66 Sports Nutrition Resource Manual, 2nd Edition.*

# Iron for Athletes



- Iron is an essential component of hemoglobin:
  - carries oxygen to all cells of the body.
  - Involved in the metabolism of other nutrients.

- Athletes with **increased caloric intake** usually receive enough iron for their needs.

***Who is at risk for having insufficient iron intake?***

***Which Food Group contains iron?***

***Refer to the Iron Brochures for more Information.***

# Two Types of Iron

- Heme Iron
  - **Animal food sources only**
  - **Readily absorbed** by the body

  ~ 23% absorption
- Non-Heme Iron
  - **Plant sources**
  - **Poorly absorbed** by the body

  ~ 3–5% absorption

| Examples of Heme Iron Sources | Examples of Non-Heme Iron Sources |
|---|---|
| Hamburger, Lean 3 oz (90 g) = 7.5 mg | Dried Apricots ½ c. (125 ml) = 2.5 mg |
| Chicken, 3 oz (90 g) = 1 mg | Breakfast Cereals = 4-18 mg |
| | Spinach ½ c. (125 ml) = 2.3 mg |
| | Peas ½ c. (125 ml) = 1.6 mg |

# Athletes & Iron Deficiency

- The body's iron status is affected by the amount of iron consumed.

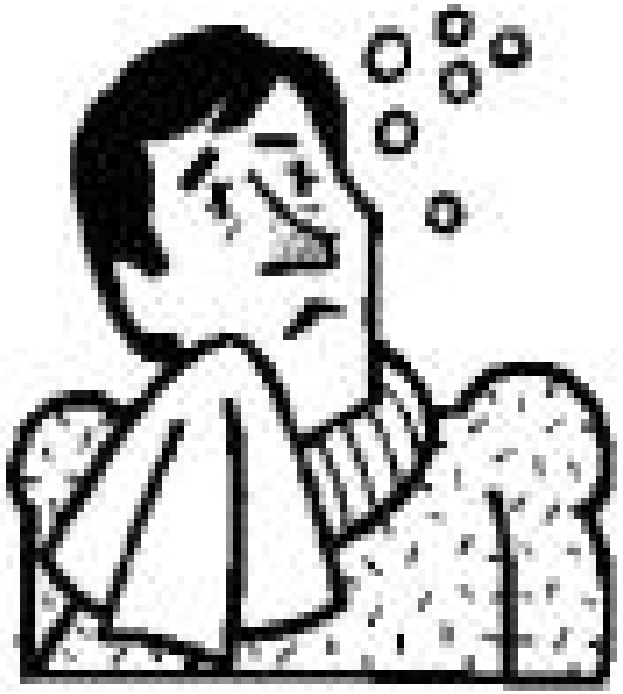
- When combined with menstruation and exercise at a **high intensity** and **long duration**, there is a **greater risk** of upsetting the bodies iron status, which may lead to iron deficiency anemia.

- **Iron deficiency anemia** may **reduce** the body's ability to provide oxygen to working muscles.

# Zinc for Athletes

**Zinc required for:**

- Maintenance of immune response.
- **Energy production** during exercise.
- Skeleton and **brain development**
- **Growth** and **reproduction**
- Repair of tissue



***60% of body's total zinc stores are found in the muscle.***

# Athletes and Zinc

- **Endurance athletes** - at risk of **low intake** and **low zinc stores.**
- Why???
  - **Diets:**
    - High in **carbohydrates**
    - **Low** in meats

  - Zinc is lost through **increased sweating.**
  - Muscle breakdown increases urinary zinc loss.

# Zinc Sources

- **Meat & Alternatives**
  - Seafood
    - Oysters, King Crab
  - Beef, Liver & Poultry
  - Legumes
    - Dried peas, beans & lentils
  - Nuts & Seeds

- **Grains**
  - Wheat Germ
  - Whole Grains
  - Enriched Breakfast Cereals

# Recommended Intake of Zinc

- **Canada Food Guide recommendations will provide healthy amount of zinc.**

- Zinc lozenge = 5 – 10 mg of zinc
  - Recommended daily intake for adults = 10 mg
  - **DO NOT** exceed a maximum daily intake of 40 mg.
  - **MORE IS NOT BETTER!**

Exercise

# Diet Records #4

***Use your diet record to answer the following questions:***

1. How many milk products did you have each day?
   - Were they good sources of Calcium?

2. How can you maximize your iron intake?

3. Do Athletes need to take Zinc Supplements?

Activity

# Nutrition Shopping Tour

***Led by a Registered Dietitian, learn how to read labels, evaluate nutritional claims and become a savvy shopper on this nutrition tour at Save-on-Foods. Coupon in workbook.***

## Learning Objectives:

- Make a plan
- Stick to "The List"
- Savvy Shopper
- Reading Labels
- Nutritional Claims

# Section 4 – Healthy Body Weights

**Topics Covered:**

- Achieving a Healthy Weight
- Body Mass Index (BMI)
- Healthy Weight Loss
- Gaining Muscle Mass
- Snacks for Weight Loss & Weight Gain
- Eating Disorders
- Female Athlete Triad

*“Aside from the limits imposed by heredity and the physical improvements associated with training, no factor plays a bigger role in exercise performance than does nutrition.”*

- Dr. David Costill (Exercise Physiologist)

# What is a Healthy Weight?

- Canada's guidelines for healthy eating recommend we all **achieve and maintain** a **healthy body weight** by enjoying regular **physical activity** and **healthy eating**.
- **A healthy body weight is** different **for everyone.**
- There are a range of body weights which are healthy for each person.

# Body Mass Index

- Body Mass Index (BMI) is a **method** used to determine **ideal body weight ranges** for the **general population**.
- There are limitations with BMI and your BMI factor may not be so accurate if you are:

1. Pregnant
2. Breast Feeding
3. Very Muscular
4. Under 20/Over 65

Pages 4-2 & 4-3

Exercise

# Calculate your BMI

***The purpose of this exercise is to determine your ideal body weight range for optimal health.***

***Follow the instructions in your workbook to calculate your BMI factor.***

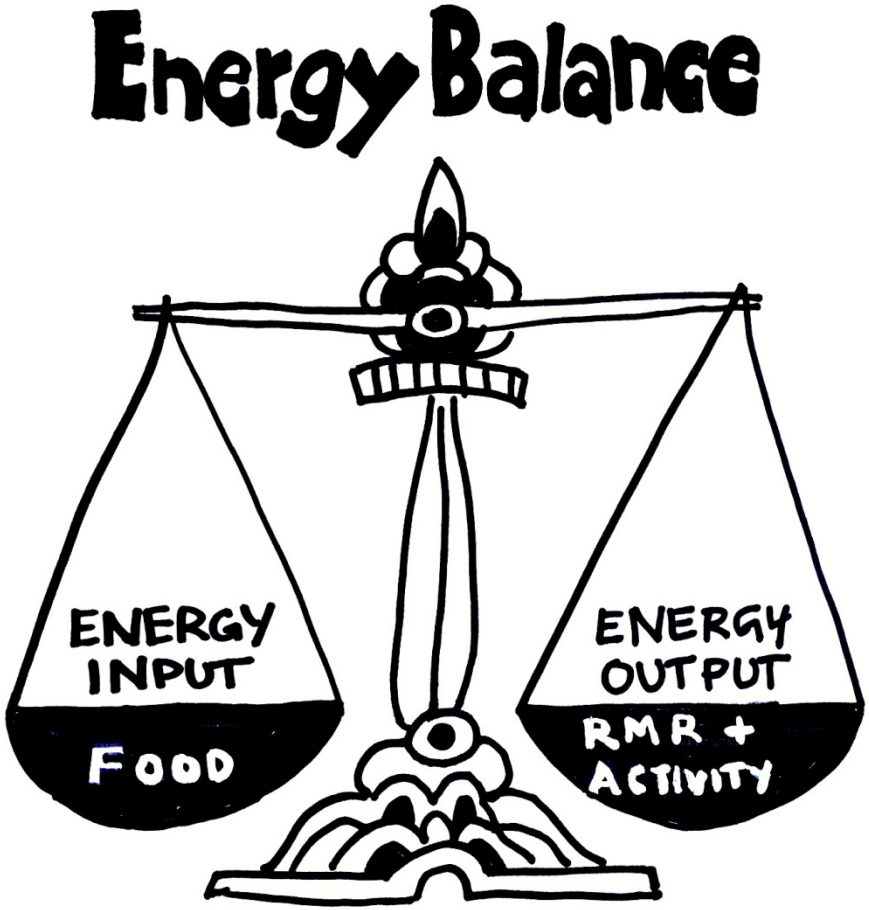
# However…

- Ideal competitive weight is individual for each person; this can not be determined by **% fat** or by **body weight**.

- **All body composition measurements have a minimum of 3% error.**

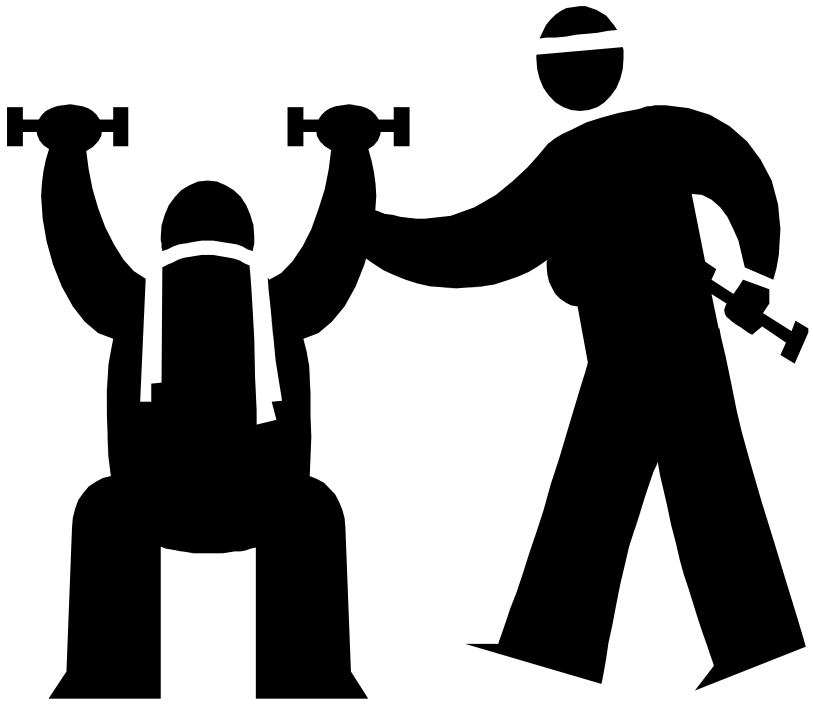
# Weight Maintenance:

Calories consumed = Calories expended



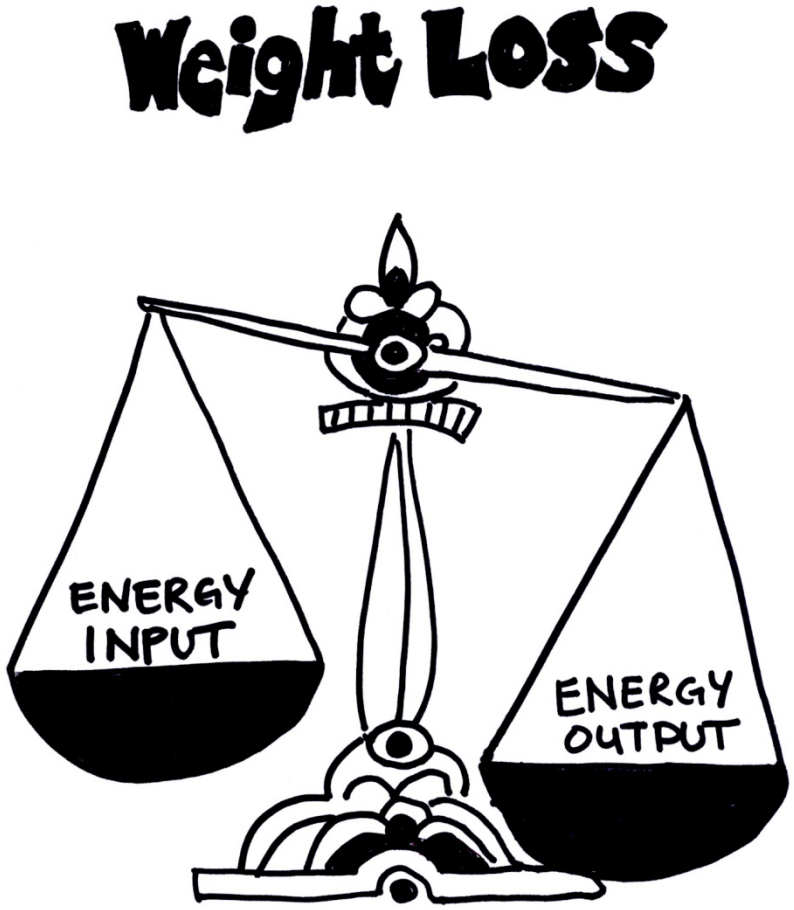
# Maintaining a Healthy Weight

- **Cardiovascular** exercise burns body fat:
  - Eg: Biking, Running & Swimming
- Strength training increases muscle mass which boosts **metabolism**.
- 1 lb body fat burns 2 calories per hour at rest.
- 1 lb body muscle burns 40 – 50 calories per hour **at rest**.



# Weight Loss:

Calories consumed **less than** Calories expended

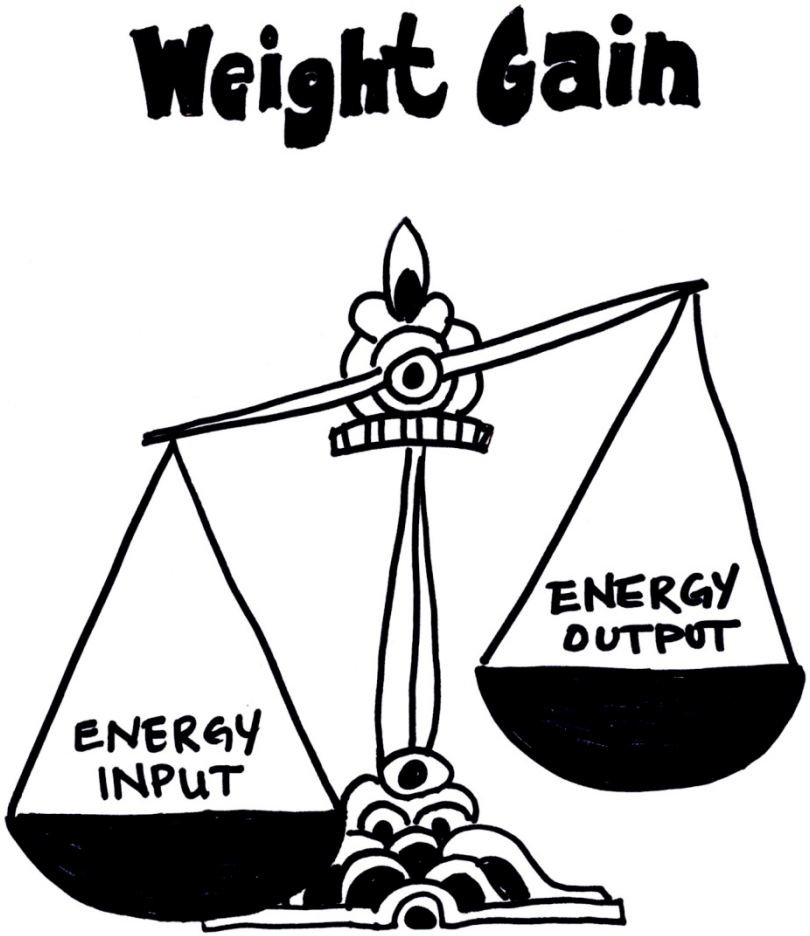


# Healthy Weight Loss

- Should be gradual: 1 – 2 lbs per week maximum: **any more and you could be losing muscle mass.**
- Should be done during off season **training,** but not during **competitions.**
- To lose the recommended number of lbs/week, **decrease** calories by 500 per day.
- Examples???

# Weight Gain:

Calories consumed **greater than** Calories expended



# Gaining Muscle Mass

- **Strength training program is essential**!
- Weight gain should be gradual:
  0.2 – 0.9 kg/week or 0.5 – 2 lbs/week.
- Slightly increase caloric intake by increasing foods from **all four food groups**.
- **Should be supervised by professionals**.

Exercise

# Snack Ideas for Wt. Loss/Gain

***The purpose of this exercise is to come up with a complete list of snacks ideas for losing or gaining weight.***

## WEIGHT LOSS

- *High Nutrient, Low Calorie*
  - Grains
  - Vegetables & Fruits
  - Milk Products
  - Meat & Alternatives

## WEIGHT GAIN

- *High Nutrient, Concentrated Calories*
  - Grains
  - Vegetables & Fruits
  - Milk Products
  - Meat & Alternatives

Exercise

# Diet Records - #5

***Use your diet record to answer the following questions:***

1. Do you snack?

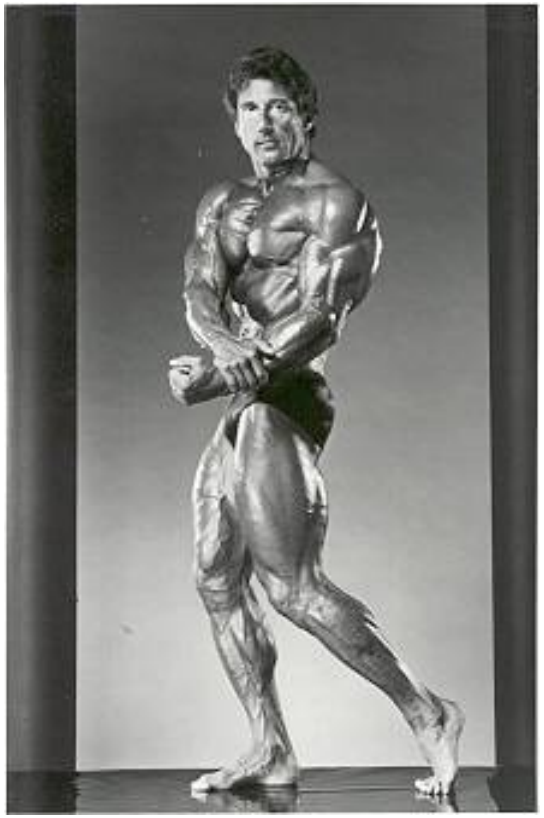
2. Would your snacks be considered weight gain or weight loss snacks?

3a) Do your snacks reflect your weight goals

b) If not, how could you alter your snacking to achieve your desired weight?

# Disordered Eating?

# Disordered Eating?



***"It's not our bodies that need changing. It's our attitudes."***

*National Eating Disorder Information Centre*
*www.nedic.ca*

# Eating Disorders

- Affects both men and women.
- The prevalence of eating disorders in the general population is 3 – 5%, while **among athletes**, the occurrence is as high as 46%!
- Among athletes, eating disorders are most common in:
    1. Long distance runners.
    2. Athletes of appearance-based sports.

# Disordered Eating Signs & Symptoms

- **Abnormal** Eating Habits
- Increase or decrease in **weight**
  - Not related to a medical condition
- **Intense pre-occupation** with weight and body image
- **Compulsive or excessive exercising**
- Self-induced **vomiting**
- Periods of **fasting**
- **Laxative, diet pill or diuretic abuse**

From Eating Disorder Education Organization

Website: http://www.edeo.org

# Disordered Eating & Athletic Performance

***Reducing food intake removes the essential nutrients needed for performance:***

| Energy Source | Result: |
|---|---|
| **Protein:** | Recovery from training and competition slowed. |
| **Fat:** | Secondary energy source unavailable which means poor performance. |
| **Carbohydrate:** | No energy available ⇨ body moves to the next energy source – fat ⇨ If fat is unavailable, then protein is used.<br><br>**When protein is used to fuel the body, it results in reduced muscle mass – a harmful outcome for training and performance.** |

# Female Athlete Triad

***Eating Disorders***
***Excessive Training***
***Psychological Stress***

***Amenorrhea***

***Osteoporosis***

## RED FLAGS

- Drive for perfection
- Desire for control
- **Compulsive behavior**
- Feelings of inadequacy
- Difficulty having fun
- Trouble with intimate relationships

# Help for Eating Disorders

## Eating Disorder Education Organization (EDEO)

- Website: http://www.edeo.org
- Email: info@edeo.org
- Phone: (780) 944-2864 or 1-888-404-3336 (outside Edmonton)

***Refer to Brochure for more Information.***

# Section 5 – Competition Nutrition

## Topics Covered:

- Competition Nutrition
- Competition Fluid Schedule
- Pre-Event Eating
- Food & Fluid Consumption during Events
- Competition Snacks
- Post-Event Eating
- Restaurant Smarts
- Competition Food Summary
- SMART Goal Setting

*“When I was racing, everyone was so keen on my diet. It gave me a great psychological edge.*

*In reality, I worked at eating a sound diet that complemented my training and recovery…*

*My diet played a huge role in my success because it allowed me to train more consistently.”*

*Dave Scott – 6 time winner of Hawaii Ironman Championship*

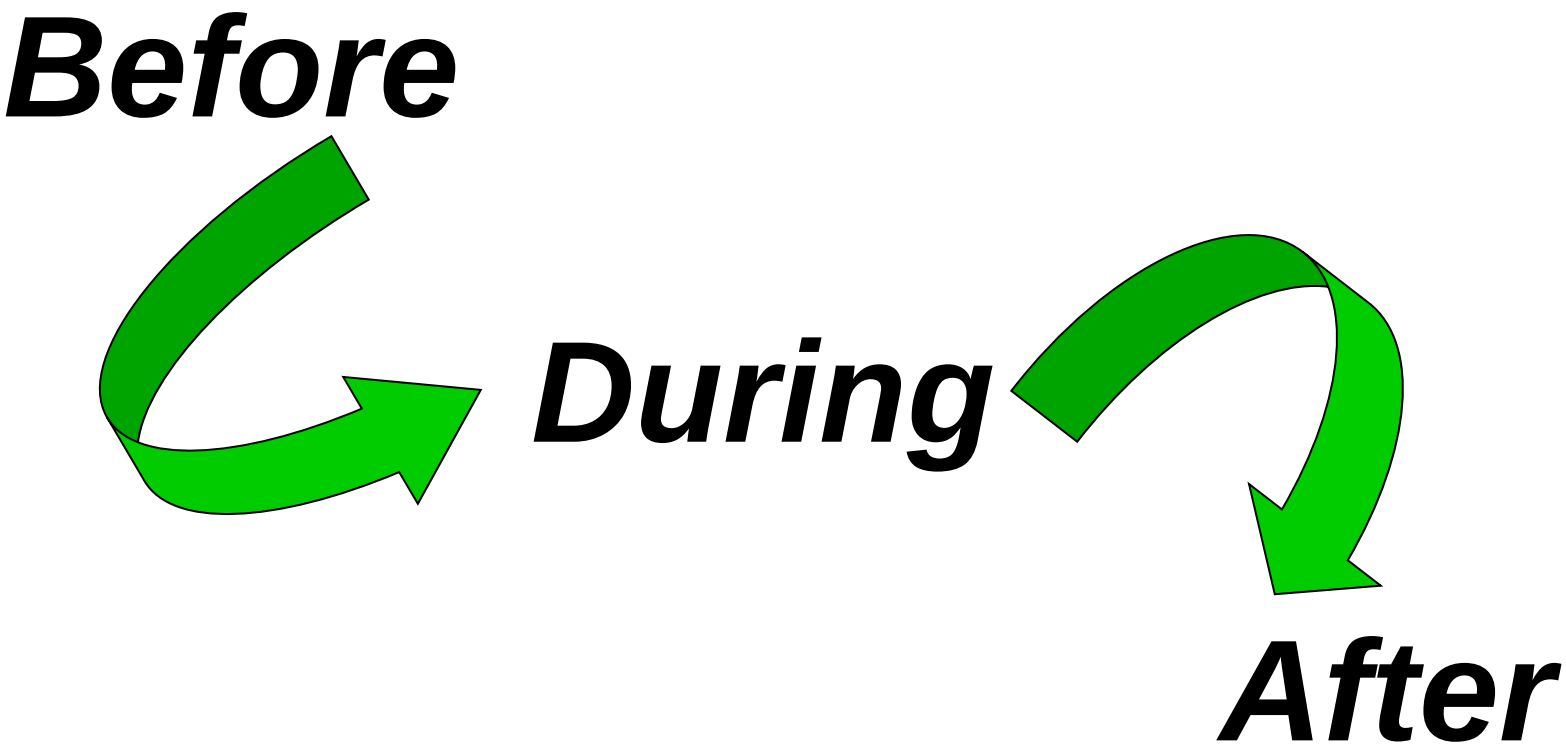
# Competition Nutrition

GOALS:

- **Hydration!!**
- High Carbohydrate
  - **High intensity, short duration.**
- Fat
  - **Moderate intensity, long duration.**
  - **Inadequate for high energy output.**
- Protein
  - **Maintain and repair muscle.**

# Competition Nutrition

## *Consider What You Eat & Drink:*



# Competition Fluid Schedule

- Below is a general guide for fluid consumption.
- Refer to your **Sweat Rates Calculation** on pg 2-6 in your workbooks to personalize your competition fluid schedule even further.

| Before Activity | During Activity | After Activity |
|---|---|---|
| 2-3 hours:<br>***2-3 cups***<br>**(500-750 ml)** | Every 15-20 mins:<br>*** 2/3 – 1 ¼ cups***<br>**(150-300 ml)** | Up to 2 hours:<br>***1 – 1.5 L/kg wt. loss*** |
| 15-30 mins:<br>***1-2 cups***<br>**(250-500 ml)** | | |

# Pre-Event Eating

- "Topping Up" blood glucose and muscle glycogen to aid in:
  - **Lengthening endurance capacity**
  - **Increasing intensity levels**

# Sample Meal: Night-Before Competition

| | |
|---|---|
| 1 cup (250 ml) | Tossed salad |
| 1 tbsp (15 ml) | Salad dressing |
| 3 cups (750 ml) | Pasta |
| 1½ cup (375 ml) | Meat and Tomato Sauce |
| 1 cup (250 ml) | Steamed Vegetables |
| 1 | Dinner Roll with |
| 1 tsp (5 ml) | Butter |
| 2 cups (500 ml) | Fruit Salad |
| 1 cup (250 ml) | Skim Milk |
| 2 cups (500 ml) | Water |

*p. 106, Sports Nutrition Resource Manual, 2nd Edition*

# Pre-Event Eating – 2-4 Hours Prior

- Include plenty of fluids
- High in complex CHO
- Low in **simple sugars**
- Low in fibre and fat
- Moderate in protein
- **Low in salt and caffeine**
- Familiar to the athlete

***Diet is not a magic bullet:*** ***consuming the perfect meal just before competition does not mean you will perform optimally. If you combine a healthy performance-based nutrition program with sound pre-event food choices, you will perform optimally.***

# Pre-Event Food Ideas

## *2-4 hours Prior*

### Grains

- Pasta - Pancake
- Rice - Pita Bread
- Crackers - Fruit Muffins

### Vegetables & Fruits

- No Skins/Seeds
  - Fresh, Frozen or Canned
  - Juices

### Dairy Products

- Yogurt (2% M.F or less)
- Skim Milk
- Cheese (20% M.F or less)

### Meat & Alternatives

- Fish canned in Water
- Lean meats, poultry and fish
  - Baked or Broiled

# Sample Meal
# 2-4 Hours Before an Event

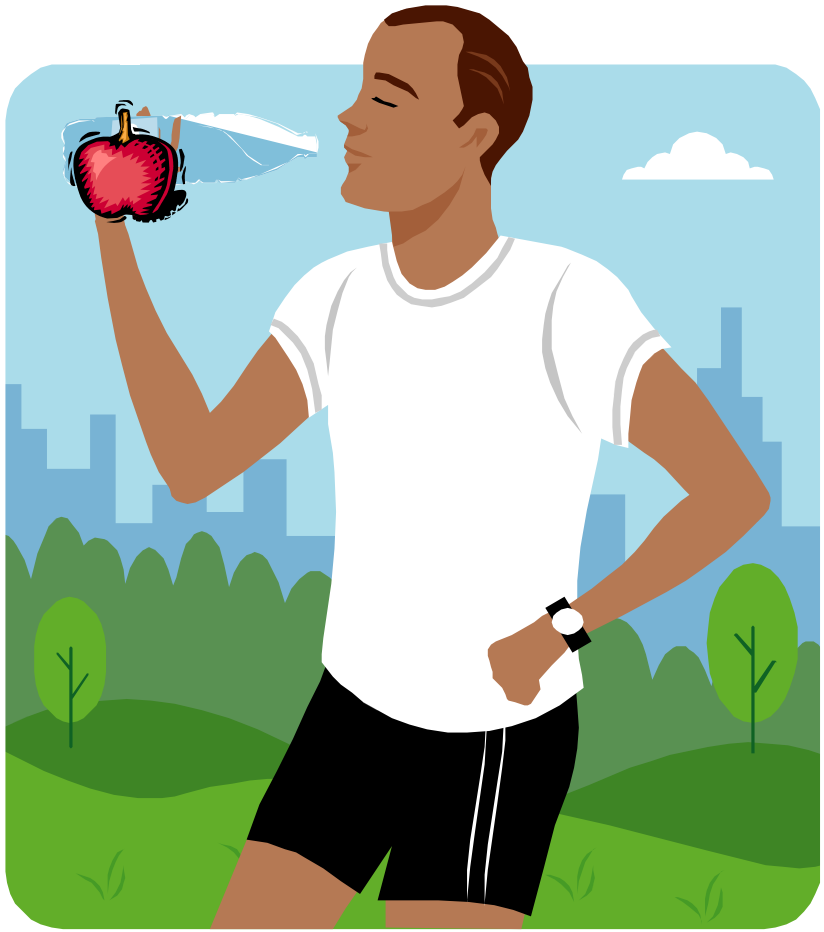
| | |
|---|---|
| 1 ½ cups (375 ml) | Cold Cereal |
| 1 cup (250 ml) | Skim Milk |
| 1 | Banana |
| 1 | Slice Bread |
| 2 oz (60 g) | Low fat Meat |
| 1-2 cups (250-500 ml) | Cold Water |

*p. 106, Sports Nutrition Resource Manual, 2nd Edition*

# Eating During an Event

- To provide simple **carbohydrates**, which are **rapidly digested and absorbed** as blood glucose.

- Extends time until glycogen stores are emptied:
  - **'Hitting the Wall'** and/or **'Bonking'**



# Competition Snacks should be…

- A small high carbohydrate snack
- **Familiar to the athlete**
- Portable or pre-packaged
- Plenty of **fluids**
- Needed only for **training sessions or competitions** lasting 45 – 90 minutes in duration.

# Competition Snacks

## Grains

- Low-Fat/Low-Sugar Cookies
  - Fig cookies, graham wafers
  - Oatmeal Raisin
- Cereal Fruit Bars

## Dairy Products

- Not suitable during competition

## Meat & Alternatives

- Not suitable during competition

## Vegetables & Fruits

- Fresh Fruits
  - Bananas
- Canned Fruits
  - Unsweetened in Water/Pear Juice
- Fruit Juices
  - Unsweetened
  - Dilute with ½ add pinch of salt

## Others

- Sport gels & drinks
- Sugar, candy & honey

# Mid-Competition Snack

***Blend together:***

| | |
|---|---|
| 1 pkg | Carnation Instant Breakfast® |
| 3 Tbsp (45 ml) | Skim milk powder |
| ½ cup (125 ml) | Plain yogurt (2% M.F or less) |
| ½ cup (125 ml) | Unsweetened Fruit juice |
| ½ cup (125 ml) | Fresh fruit (no seeds or skins) |

***For successful sporting performances, planning your meals is a MUST!***

# Post-Event Eating Goals

*3R's of Recovery*

1. **Rehydrate**
2. **Refuel**
   - Carbohydrates
   - Proteins
   - Electrolytes
3. **Rest**

***The 3 R's promote post-exercise recovery***

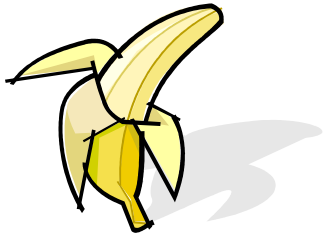
# Post-Event Eating

- Within 15-30 mins
  - **Simple Carbohydrate and some protein**
    - Eg. Juice, granola bars, vegetables & fruit, milk products, meat, poultry or fish sandwiches.
  - HYDRATION
- Within 2 hours
  - A well-balanced meal containing all food groups.
  - HYDRATION

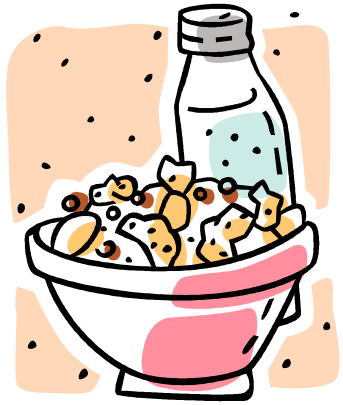
***Consuming fluid and carbohydrate within 15-30 minutes of competition completion increases the rate of muscle glycogen storage.***

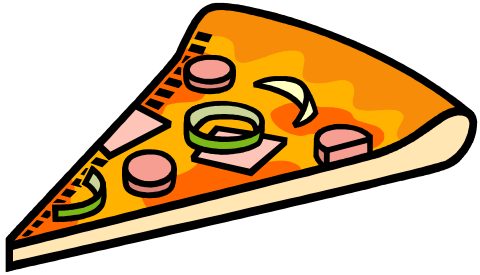
# Post-Event Snack Ideas

- Yogurt & Fruit
- Cereal & Milk with Dried Fruit
- ½ bagel or slice of toast with peanut butter and banana
- Homemade, Low-fat Muffins
- Pita Bread and Vegetables with Hummus
- Leftover pizza with extra vegetables



**Complete List on pg. 6-5 of workbooks**





# Restaurant Smarts

- Ask for **substitutions.**
- Avoid **cream sauces and gravies.**
- Watch out for “salad” sandwiches.
- Avoid fried foods.
- Skip the high fat desserts.

***More tips on healthy eating in restaurants are located in your workbook appendix***

# Summary

## *Proper Hydration!!!*

**FOUNDATION** = **Training** Diet

BEFORE COMPETITION = **Top up your energy stores.**

**DURING COMPETITION** = **Extend** energy.

AFTER COMPETITION = **Resting & refueling.**

***Competition Nutrition Summary on pg. 5-8***

Exercise

# The Final Exercise…Part 1

***Using your Diet Records and the Information you Learned about in this course:***

1. What changes do you feel you can implement into your training diet to improve your performance, energy levels and health?

Exercise

# SMART Goal Setting

***S**pecific*

***M**easurable*

***A**ttainable*

***R**ealistic*

***T**angible*

http://www.topachievement.com/start.html

Exercise

# The Final Exercise…Part 2

***Based on today's class and using the SMART goal setting guidelines:***

1. Create one goal for yourself that can:
   - Be accomplished in the next 3 weeks
   - Help improve your sport performance or overall health

2. Write down your goal on the postcard provided.

3. Fill out name and address on postcard.

# Thank You For Coming!