

Chapter 5 · Sports and Nutrition

CBSE Class 12 Physical Education (048) · Unit 5 = 7 marks · Ultimate Revision Sheet

60-SECOND RECALL

Macro nutrients (3)	Carbohydrates · Proteins · Fats — needed in large amounts, give energy
Micro nutrients (2)	Vitamins · Minerals — needed in small amounts, no energy
Energy values	Carbohydrate 4 kcal/g · Protein 4 kcal/g · Fat 9 kcal/g
Non-nutritive (5)	Water · Fibre/roughage · Colour compounds · Flavour compounds · Preservatives
Fat-soluble vitamins	A, D, E, K — the rest (B complex, C) are water-soluble
Pre-competition	High carbohydrate, low fat, low fibre , 3–4 hours before

1. Balanced Diet and Nutrition

DEFINITIONS *Nutrition is the process by which a living organism takes in and uses food for growth, repair and maintenance.*

Nutrients are the chemical substances in food that provide energy and support body functions.

A balanced diet is one that contains all the nutrients in the correct proportion and in adequate quantity to meet the body's needs.

Elements of a balanced diet: carbohydrates, proteins, fats, vitamins, minerals, water and roughage — in the right proportion, adjusted for age, sex, activity level and climate.

2. Macro Nutrients

THE THREE MACROS

Nutrient	Function	Sources	Notes
Carbohydrates 4 kcal/g	Main and quickest source of energy ; spares protein; needed for brain function	Rice, wheat, potato, sugar, bread, fruits, honey, jaggery	Simple (glucose, fructose — quick) and Complex (starch, cellulose — slow). Stored as glycogen in liver and muscles.
Proteins 4 kcal/g	Body building — growth and repair of tissues; makes enzymes, hormones and antibodies	Milk, eggs, meat, fish, pulses, soya, nuts	Made of amino acids . First class (complete, animal source) contain all essential amino acids; second class (plant) do not.
Fats 9 kcal/g	Concentrated energy ; insulates the body; protects organs; carries vitamins A, D, E, K	Ghee, butter, oil, nuts, cheese, meat	Saturated (animal, solid, raises cholesterol) and Unsaturated (plant, liquid, healthier).

3. Micro Nutrients

VITAMINS

Vitamin	Type	Source	Deficiency disease
A	Fat soluble	Carrot, milk, green vegetables, liver	Night blindness , xerophthalmia

D	Fat soluble	Sunlight , fish oil, egg yolk, milk	Rickets (children), osteomalacia (adults)
E	Fat soluble	Vegetable oil, nuts, wheat germ	Infertility, muscular weakness
K	Fat soluble	Green leafy vegetables, tomato	Delayed blood clotting
B₁	Water soluble	Whole grains, pulses, nuts	Beri-beri
B₂	Water soluble	Milk, egg, green vegetables	Cracked lips, sore tongue
B₁₂	Water soluble	Meat, fish, egg, milk	Anaemia
C	Water soluble	Citrus fruits, amla, guava, tomato	Scurvy , bleeding gums

MINERALS

Mineral	Function	Source	Deficiency
Calcium	Bones and teeth; muscle contraction; blood clotting	Milk, cheese, green leafy vegetables	Rickets, osteoporosis
Iron	Forms haemoglobin ; carries oxygen	Green leafy vegetables, jaggery, liver, dates	Anaemia
Iodine	Thyroid hormone production	Iodised salt, sea food	Goitre
Sodium & Potassium	Fluid balance, nerve and muscle function	Salt, banana, potato	Cramps, weakness
Phosphorus	Bones and teeth; energy transfer	Milk, meat, pulses	Weak bones

TRAP *Micro nutrients give NO energy.* Vitamins and minerals are needed in tiny amounts and act as **regulators**. Only carbohydrates, proteins and fats supply calories. A common wrong answer is “vitamins give energy”.

4. Nutritive and Non-Nutritive Components

Type	Components
Nutritive	Carbohydrates, proteins, fats, vitamins, minerals, water — they nourish the body
Non-nutritive	Water (also nutritive), Fibre / roughage , Colour compounds (chlorophyll, carotene), Flavour compounds , Preservatives , plant compounds like caffeine — they add no nutrients but serve other purposes

Roughage / dietary fibre — indigestible plant material. Prevents **constipation**, adds bulk, helps control cholesterol and blood sugar, gives a feeling of fullness. Sources: whole grains, fruits, vegetables, pulses.

Water — regulates body temperature, transports nutrients, removes waste, lubricates joints. Dehydration of even 2% of body weight reduces performance sharply.

5. Eating for Weight Control

HEALTHY WEIGHT

$$\text{BMI} = \text{Weight (kg)} \div \text{Height}^2 (\text{m}^2)$$

Under 18.5 underweight · 18.5–24.9 normal · 25–29.9 overweight · 30+ obese

Pitfalls of dieting

- **Loss of muscle** along with fat
- **Slowed metabolism** — body conserves energy
- **Nutrient deficiency** and weakness
- **Dehydration** and electrolyte imbalance
- **Yo-yo effect** — weight regained quickly
- **Eating disorders** and psychological stress

Food myths — and the truth

- “Skipping meals reduces weight” → it **slows metabolism**

Food intolerance — difficulty **digesting** a food, causing bloating, gas, cramps and diarrhoea. It involves the **digestive system**, not the immune system, and is **not life-threatening**. Eg: **lactose intolerance**, **gluten intolerance**.

Food allergy — an **immune** reaction that can be severe and even fatal.

6. Diet in Sports — Pre, During, Post

THE THREE PHASES — a guaranteed question

Phase	What to eat and why
PRE-competition	Main meal 3–4 hours before. High carbohydrate (to fill glycogen stores), low fat and low fibre (they digest slowly and cause discomfort), moderate protein , plenty of fluid . Avoid new or spicy foods. A light carbohydrate snack may be taken 1 hour before.
DURING competition	Focus on fluid and electrolyte replacement to prevent dehydration. Sports drinks with 6–8% carbohydrate and electrolytes for events over an hour. Small, frequent sips rather than large amounts. Easily digestible carbohydrates such as glucose, banana or energy gel.
POST-competition	Replenish glycogen with carbohydrate within 30 minutes to 2 hours (the recovery window). Protein to repair muscle tissue. Fluid and electrolytes to restore hydration. Recommended ratio roughly 3 or 4 parts carbohydrate to 1 part protein .

TRAP Pre-competition food must be **LOW in fat and fibre**, not high. Fat and fibre slow gastric emptying and cause cramps and heaviness during performance. Carbohydrate is the one to load.

7. Question Triggers which nutrient / which phase?

If the question says...	Answer
“quickest source of energy”	Carbohydrates
“body building nutrient”	Proteins
“most concentrated source of energy”	Fats (9 kcal/g)
“needed in small amounts, no energy”	Micro nutrients — vitamins and minerals
“night blindness”	Vitamin A deficiency
“rickets in children”	Vitamin D / calcium deficiency
“bleeding gums, scurvy”	Vitamin C deficiency

"goitre"	Iodine deficiency
"anaemia, low haemoglobin"	Iron deficiency
"prevents constipation, adds bulk"	Roughage / dietary fibre
"meal 3 hours before the match"	Pre-competition — high carb, low fat, low fibre
"what to consume during a marathon"	Fluids + electrolytes , 6–8% carb drink
"recovery within 30 minutes"	Post-competition — carb + protein
"bloating after milk"	Food intolerance (lactose), not allergy
"BMI is 31"	Obese

MOST-ASKED BOARD QUESTIONS

1. [5M] Explain the pre, during and post competition nutritional requirements of an athlete.
2. [3–5M] Explain macro and micro nutrients with their functions and sources.
3. [3M] What are the pitfalls of dieting? / Explain any three food myths.
4. [3M] Differentiate between nutritive and non-nutritive components of diet.
5. [1M] Energy value of fat? → 9 kcal per gram
6. [1M] Name the fat-soluble vitamins. → A, D, E, K

THE HABIT THAT SCORES — Nutrient answers need **function + source + deficiency**, all three. "Vitamin A is good for eyes" is a third of the answer; "Vitamin A — needed for vision; found in carrots and milk; deficiency causes night blindness" is the full mark.