Chapter – 2: Components of Food

- Substance – required for maintaining life and growth – nutrient
- Our food – 5 major nutrients – carbohydrates, fats, proteins, vitamins, minerals
- Addition to these nutrients – water, roughage (dietary fibre) – no food value
- Total – 7 components – 5 nutrients + water and roughage

Components of Food

- Carbohydrates
  - Glucose, cane sugar, starch
  - Provide energy
  - Main carbohydrate – starch – cereals – wheat, rice
  - Potatoes – contain carbohydrate
  - Sources – cereals, potato, sweet potato, sugar, jaggery, honey, banana, mango, melon, papaya
- Fats
  - Also provide energy – twice more energy than carbohydrates
  - Butter, ghee, oils – common fats – everyday life
  - Fats – richest source – more expensive than carbohydrates
  - Foods – contain fats and carbohydrates – energy giving foods
  - Butter, ghee, milk, cheese, oils, egg yolk, meat, groundnut, cashew, soybean
  - Plant sources – oils, groundnuts, *Til*
  - Animal sources – butter, ghee, milk, cream, cheese, egg, meat
- Proteins
  - Supply materials – help in growth of body – repair body
  - Foods – contain proteins – body building foods
  - Children – need more protein
  - Milk, cheese, pulses, peas, beans, soybean, groundnut, meat, chicken, egg
  - Plant sources – pulses, beans, peas, soybean, groundnut
  - Animal sources – milk, cheese, fish, meat, chicken, eggs
- Vitamins
  - Necessary for – eyesight, teeth, gums, digestion, bones
  - Protect against diseases
  - Many different vitamins – A, B, C, D, E, K – vitamin B – B_1, B_2, B_3, B_4, etc
  - Body require – all vitamins – small quantities
    - Vitamin A
      - Necessary for – good eyesight, healthy skin and hair
      - Milk, butter, carrot, fish liver oil, egg, green vegetables, mango, papaya
    - Vitamin B_1
      - Necessary for – growth, digestion, heart, nerves, muscles
      - Milk, egg, meat, wholegrain cereals (rice), proteins, yeast, green vegetables
    - Vitamin C
      - Necessary for – teeth, gums, joints
      - Increases resistance to infection – fights diseases
      - Citrus foods (oranges, lime, lemon), amla, tomato, guava, green vegetables

        - Vitamin D
            - Necessary for – bones, teeth
            - Helps in absorbing – calcium mineral
            - Milk, fish, egg, butter, fish liver oil
            - Skin – exposed to sunlight – produce vitamin D
            - Small children – exposed to sunlight – prevent rickets
- Minerals
    - Necessary for – proper functioning and growth, good health, healthy bones and teeth, coagulation of blood, formation of blood, functioning of muscles, nerves, thyroid gland, etc
    - Minerals used as salts – not as elements
    - Many different minerals – calcium, phosphorus, iron, iodine, sodium, potassium
        - Calcium and Phosphorus
            - Needed for – formation of bones and teeth
            - Also needed for – proper functioning of heart and other muscles, clotting of blood
            - Children – need more calcium
            - Calcium sources – Milk, cheese, eggs, green leafy vegetables, fish
            - Phosphorus sources – milk, pearl millet (*bajra*), banana, pulses, green leafy vegetables
            - Milk – contains good amounts of both calcium and phosphorus – drink daily – strong bones and teeth
        - Iodine
            - Necessary for – thyroid gland – controls growth of body
            - Sea food, fruits, vegetables, Iodised salt, drinking water of all places (except hilly areas)
        - Iron
            - Necessary for – making haemoglobin in red blood cells
            - Spinach, other green leafy vegetables, apples, eggs, liver, cereals, pulses, groundnut
- Water
    - Essential for life – BUT – no food value
    - Provides a liquid medium – substances dissolve – move within body – eliminate from body
    - Needed for –
        - Transport digested food
        - Transport hormones (imp. chemicals)
        - Remove waste products
        - Control and regulate temperature
    - Digested food – dissolved in water – carried by blood
    - Hormones – carried by water through blood
    - Waste products – dissolved in water – removed from body
    - Control and regulate temperature – sweating and evaporation
        - Outside temperature – high – sweating – water comes out through skin
        - Sweat – evaporates – takes the heat with itself – skin cools down
    - Daily requirement – 2-3 litres of water
    - Most of the water requirement – drinking water, milk, tea, coffee, juice
    - Fresh fruits and vegetables – provide lots of water

- Roughage (dietary fibre)
    - Fibrous material – cannot be digested
    - Made of indigestible carbohydrate – cellulose – present in plant cell walls
    - Fibre that can be eaten
    - No food value
    - Needed for proper digestion
    - Provides bulk to food – keeps the food and waste products moving inside intestine
    - Sources – plant products – fruits, vegetables, whole meal flour products

- Some food – contain more than one nutrients
    - Rice – carbohydrate – main nutrient
    - Butter – fat – main nutrient
    - Fish – protein – main nutrient

Test for food nutrients

- Identify major nutrients – perform some tests
- Tests for vitamins and minerals – taught in higher classes
- This class – tests for carbohydrates, fats, and proteins only

- Test for carbohydrates
    - Main carbohydrate – starch
    - Test for starch –
        - Take small quantity of food – add 2-3 drops of dilute iodine solution
            - If blue-black colour is obtained – starch present
            - No change in colour – starch not present
        - Cut a potato – drop few drops of iodine solution – blue-black colour obtained
        - Mix flour with water – add iodine solution – blue-black colour obtained
        - Take some egg white – add iodine solution – blue-black colour not obtained
- Test for fats
    - Produce greasy patch – rubbed on clean sheet of paper
    - Test for fats –
        - Take some food – wrap it in clean paper – look through the paper in front of light
            - If paper turns translucent (light passed through it partially) – fats present
            - If paper does not turns translucent – fats not present
        - Take some butter – place it on paper – cover it – press it – paper becomes translucent
        - Butter – soft food – checked easily
        - Take some ground nut (hard, solid food) – crush it with hammer – place it on paper and rub it – paper becomes translucent
- Test for proteins
    - Proteins – give out violet colour with alkaline solution of copper sulphate
    - Test for proteins –
        - Take 2 ml of solution of food stuff – add little dilute sodium hydroxide solution – let the mixture clear – add 2-3 drops of copper sulphate solution (blue)
            - If solution turns violet – proteins are present
            - If solution remains blue – proteins not present

        - Take some milk in test tube – add few drops of sodium hydroxide solution – add 2-3 drops of copper sulphate solution – violet colour appears

Balanced Diet

- Food we eat – diet
- Diet – supply all nutrients – adequate (required / correct) amounts – balanced diet – also contains – water and roughage
- Single food item – cannot provide all the nutrients
- Balanced diet – include a number of food items from each category –
    - Cereals, potatoes, sugars, etc (carbohydrates)
    - Butter, ghee, oil (fats)
    - Pulses, peas, milk, cheese, fish, meat, chicken , egg, (proteins)
    - Vegetables and fruits (vitamins, minerals, roughage)
    - Water
- Depends on age and type of work

Dependence on age

- Diet of child – different from adult
- Growing child's diet – more proteins – helps in growing body tissue – more minerals (calcium and phosphorus) – formation of bones

Dependence on type of work

- Diet of someone doing hard physical work – more than someone other doing some normal work
- Need more energy – these men's diet – more carbohydrates – provide more energy
- Eating too much fatty food – oils and butter – leads to obesity

Avoid wasteful pre-cooking and cooking practices

- Raw food – washed up, peeled, cut and cooked – eat them after
- Wasteful pre-cooking practices –
    - Repeated washing of rice and pulses
        - Removes water soluble vitamins and minerals
    - Washing fruits and vegetables after peeling or cutting them
        - Removes water soluble vitamins and minerals
    - Taking thick peels from fruits and vegetables
        - Loss of vitamins and minerals – peels contain valuable nutrient
- Cooking – increases taste – helps in digestion
- Wasteful cooking practices –
    - Cooking food at high temperatures
        - Loss of vitamin C
    - Throwing away water in which food is boiled
        - It contains – so many valuable nutrients

Deficiency Diseases

- Many nutrients – required in our diet
- Any one in less quantity or missing – deficiency

- Diseases caused due to this – deficiency diseases

Protein deficiency diseases

- Deficiency of protein – kwashiorkor – 1-5 years of age
- Mother stops feeding breast milk – children have carbohydrate-rich diet
- Symptoms
    - Hair – changes colour to red
    - Skin becomes rough
    - Stomach – swells and bulges out
    - Slow growth
    - Reduced resistance
    - Child – weak, irritable

Protein and carbohydrate deficiency disease

- Deficiency of both protein and carbohydrate – marasmus – small babies upto 1 year
- Mother stops feeding breast milk – children have less nutritive diet
- Symptoms
    - Child – lean and thin
    - Bones – show through skin
    - Ribs – visible through skin
    - Growth – stops completely
    - Weight – very low

Vitamin deficiency diseases

- Deficiency of Vitamin A
    - Night blindness – less vision in night (dim light)
    - Too much deficiency – loss of vision
- Deficiency of Vitamin B_1
    - Beri-beri – muscles very weak, very little energy
    - Heart failure may occur – paralysis may happen too
- Deficiency of Vitamin C
    - Scurvy – bleeding of gums, loosening teeth
    - Wounds do not heal easily
- Deficiency of Vitamin D
    - Rickets – bent legs
    - Vitamin D – helps in absorbing calcium – makes the bones strong
    - Deficiency of vitamin D – bones remain soft – bend easily
    - Poor teeth formation

Mineral deficiency diseases

- Deficiency of Calcium
    - Bones – soft at birth – require calcium to get strong
    - Rickets – bent legs – poor growth of teeth – children's disease
    - Deficiency in adults – brittle bones and teeth
- Deficiency of Iodine
    - Cretinism – feeble (weak) mindedness – reduced physical growth, mental disability – in children
    - Goitre – thyroid gland expands – neck appears swollen – in adults

- Observed more in hilly areas – water supply and food – less iodine
- Coastal areas – eat lots of sea food – rich in iodine

Deficiency of Iron

- Anaemia – less haemoglobin – less oxygen – less production of energy
- Symptoms – person looks pale, feels very week, tires easily, loses weight, nails turn white

- Balanced diet – provide all nutrients – required amount – prevent deficiency diseases