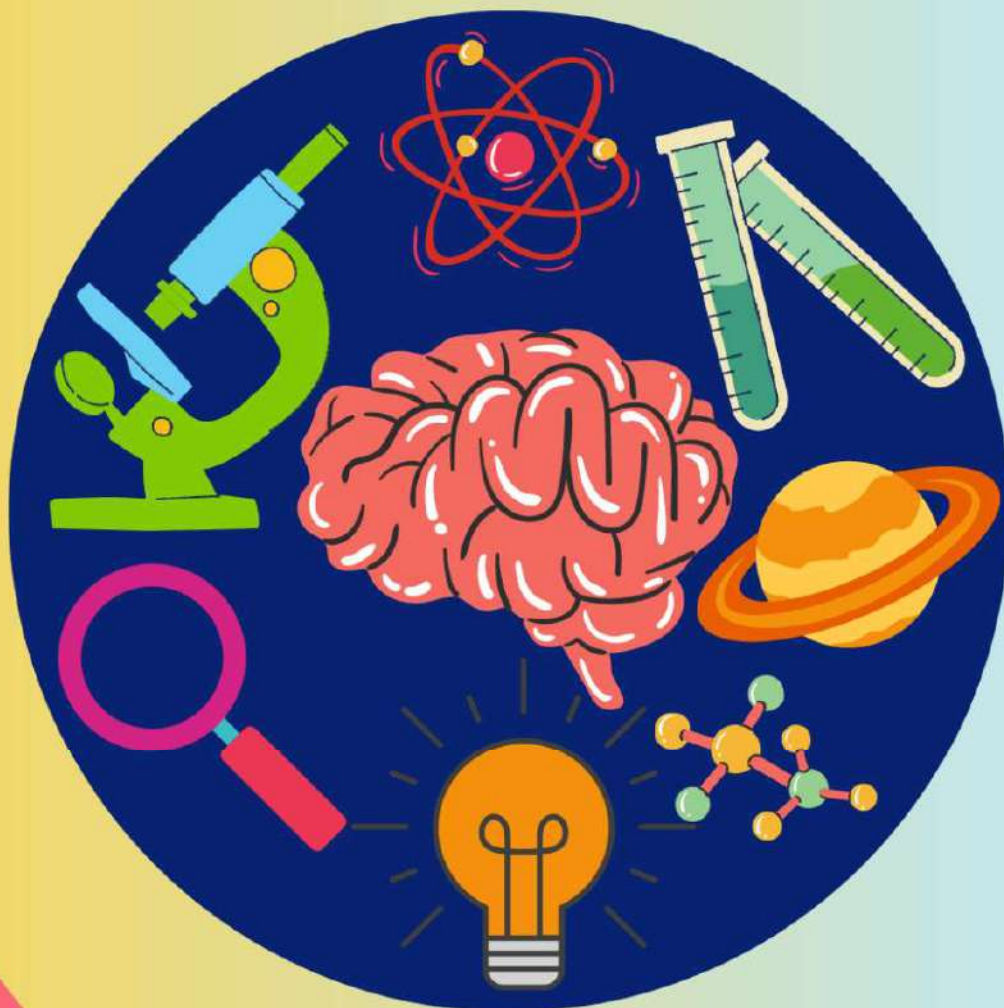


# SCIENCE WORKBOOK

6

For the preparation of National  
& International Olympiads



- Chapter-wise practice exercises
- Previous year paper

**CREST Science Olympiad (CSO)**

# Science Olympiad

## Exams Preparation Book

CSO | NSO | USO | iOS | NSTSE | HSO

**Grade 6**



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## CREST Science Olympiad Workbook for Grade 6

Second Edition

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**Disclaimer:** The information in the Workbook is to give you the path to success but it does not guarantee 100% success as the strategy is completely dependent on its execution. And it is based on previous year papers of CSO exam.

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# Preface

We are pleased to launch a thoroughly revised edition of this workbook. We welcome feedback from students, teachers, educators and parents. For improvements in the next edition, please send your suggestions at [info@crestolympiads.com](mailto:info@crestolympiads.com).

CREST Olympiads is one of the largest Olympiad Exams with students from more than 25 countries. The objective of these exams is to build competitive spirit while evaluating students on conceptual understanding of the concepts.

We strive to provide a superior learning experience, and this workbook is designed to complement the school studies and prepare the students for various competitive exams including the CREST Olympiads. This workbook provides a crisp summary of the topics followed by the practice questions. These questions encourage the students to think analytically, to be creative and to come up with solutions of their own. There's a previous year paper given at the end of this workbook for the students to attempt after completing the syllabus. This paper should be attempted in 1 hour to get an assessment of the student's preparation for the final exam.

*Publishers*

# Chapter 1

# Food and its Components

---

## Sources of Food

We eat variety of fruits, vegetable, cereals and pulses. Both plants and animals provide us food. Some of the food we eat are obtained from plants such as vegetables, fruits, cereals, oil, sugar, spices, pulses etc. While some of the foods are obtained from animals such as milk and meat, eggs, milk products (cheese, curd, ghee, butter) etc.

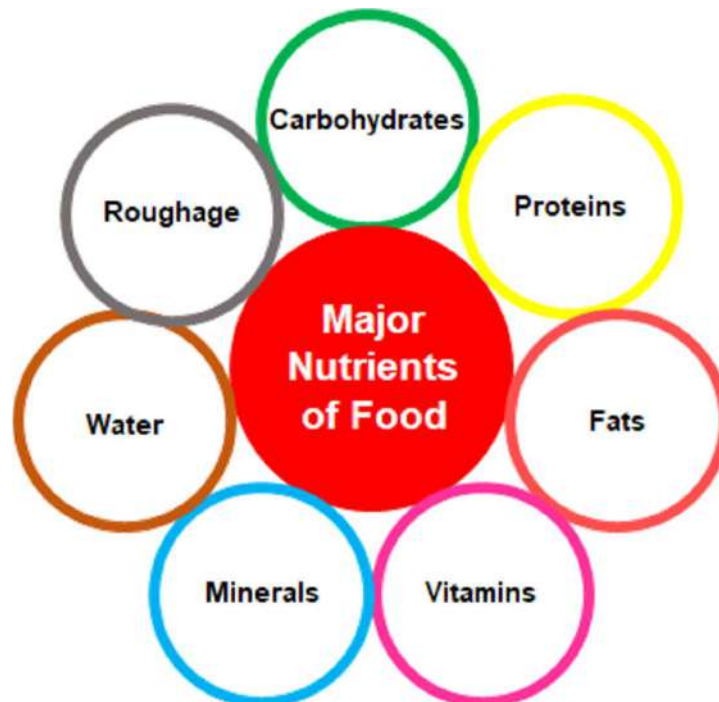
## Components of Food

Different components of foods have different nutrients.

We need nutrients to:

- obtain energy
- obtain materials for growth and repair of damaged tissue
- carry out life processes

There are five major nutrients present in our food namely carbohydrates, fats, proteins, vitamins and minerals. In addition to these, food also contains dietary fibres (roughage) and water.



Every food does not have all the nutrients. Some foods may be rich in one nutrient but may lack in other.

|                      |   |
|----------------------|---|
| <b>Carbohydrates</b> | Carbohydrates in our food are mainly in the form of sugar, starch. Starch is present in grains like rice, wheat, maize, tubers like potatoes etc.<br>Sugar is the sweet substance. Common sugar we use is sucrose and it is obtained from sugar cane.<br>Food rich in carbohydrates are also known <b>as energy-giving food</b> . |
| <b>Fats</b>          | Fats gets stored in our body and are also known as <b>energy-giving food</b> . Fats give much more energy than carbohydrates. Animal sources of fats include milk, butter, cheese and meat. Plants sources of fats include oil.   |
| <b>Proteins</b>      | Proteins are known as <b>body-building food</b> as they help in body growth and repair of damaged parts of the body.<br>Animal sources of proteins include eggs, fish, meat, milk, cheese. Plant sources of proteins include pulses of beans.   |
| <b>Vitamins</b>      | Vitamins and minerals are collectively called <b>protective food</b> as they protect us from many diseases. Different types of vitamins are A, B, C, D, K, E.   |
| <b>Minerals</b>      | Minerals are required in small quantities. Minerals include sodium, calcium, potassium, iodine and phosphorous.   |
| <b>Roughage</b>      | Roughage is mainly provided by plant products such as fruits, whole grains, pulses and vegetables in our food. It helps prevent constipation.   |
| <b>Water</b>         | Water helps in absorbing nutrients from our food, transporting nutrients throughout the body, regulating our body temperature.  |

The following table shows the different types of vitamins, their sources, functions and deficiency diseases caused by them:

| <b>Vitamin and Sources</b>   | <b>Functions</b>   | <b>Deficiency Diseases</b>                  |
|--|--|---|
| Vitamin A<br>Sources - Mangoes, leafy green vegetables, oranges, pumpkin, sweet potatoes                                     | Maintains healthy bones, skin, tissue and teeth                                    | Colour blindness, night blindness           |
| Vitamin B <sub>1</sub> (thiamine)<br>Sources - Eggs, meat, dried herbs, sunflower seeds, whole grain cereals, milk           | Helps in functioning of digestive and nervous system                               | Beriberi- loss of appetite, loss of weight. |
| Vitamin B <sub>2</sub> (riboflavin)<br>Sources - Eggs, almonds, bananas, green vegetables, milk, dried spices, fish and meat | Maintains body growth and RBCs i.e., Red Blood Cells, keeps skin and mouth healthy | Skin disorders, Cheilosis-breaking of lips  |

|   |   |  |
|---|---|--|
| Vitamin B <sub>12</sub> (cyanocobalamin)<br>Sources - Animal products like meat, fish, liver, eggs and milk | Helps in maintenance of central nervous system and RBCs               | Pale skin, Anaemia, less stamina and less appetite.          |
| Vitamin C<br>Sources - Citrus fruits like papaya, oranges, tomatoes, strawberries, guava                    | Keeps gums, teeth and joints healthy. Builds resistance to infections | Scurvy i.e., gum disease (gingivitis).                       |
| Vitamin D<br>Sources - Sunshine, mushrooms, liver, fish and eggs  | Necessary for the healthy development of bones and teeth              | Rickets and Osteomalacia - weakening and softening of bones. |
| Vitamin K<br>Sources - Green leafy vegetables, soyabean oil, tomatoes, egg yolk                             | Essential for blood coagulation                                       | Excessive bleeding from wound.                               |

The following table shows the different types of minerals, their sources, functions and deficiency diseases caused by them:

| <b>Minerals and Sources</b>  | <b>Functions</b>   | <b>Deficiency Disease</b>  |
|--|--|--|
| Calcium<br>Sources - Green leafy vegetables, milk and milk products      | Keeps bones and teeth strong and healthy   | Weak bones, lower than normal bone density and stunted growth    |
| Phosphorous<br>Sources - Meat, milk and milk products                    | Keeps bones and teeth strong and healthy, Maintenance of acid-base balance in body | Loss of appetite, bone fragility, muscle weakness, poor physique |
| Iodine<br>Sources - Seafood, iodized salt                                | Formation of thyroid hormone   | Goitre - Enlargement of thyroid gland, mental disability         |
| Sodium<br>Sources - Common salt  | Helps in proper functioning of nervous system                                      | Nausea, irritability, dehydration                                |
| Iron<br>Sources - Cereals, green vegetables, banana, honey, whole grains | Essential for haemoglobin formation in RBCs.                                       | Anaemia - weakness, fatigue, shortness of breath                 |

## Test for Carbohydrates

To test the presence of starch in a food sample. Few drops of dilute iodine solution are added to the food sample. If the iodine changes colour to blue-black, the presence of starch (carbohydrate) is confirmed.



## Test for Proteins

To test the presence of proteins in a food sample. First the food sample is grounded into a paste or powder form and 10 drops of water is added to it. To this mixture 2 drops of copper sulphate solution and 10 drops of caustic soda solution are added. After a few minutes, if the mixture turns violet, it indicates of the presence of protein.

## Test for Fats

To test the presence of fats in a food sample. A little of sample food is wrapped in a paper and crushed. If the paper gets an oily patch, it indicates the presence of fat in the food sample.

## Balanced Diet

A balanced diet is a diet that has all the necessary nutrients in the right amount that is needed for normal body functioning.

A balanced diet includes a combination of protein-rich pulses, sprouted seeds etc. with combinations of various flours and cereals for carbohydrates and fats along with fruits and vegetables which provide the necessary vitamins and minerals.

## Malnutrition

When the body does not get adequate nutrition, it is said to be suffering from malnutrition.

When there is lack of protein in our bodies, repair of wounds and an injury becomes difficult. When this is combined with inadequate intake of calories, it leads to a condition known as **Protein-energy under nutrition** or malnutrition.

Deficiency of proteins leads to a disease called kwashiorkor, and deficiency of proteins along with carbohydrates and fats leads to a disease called marasmus.

| <b>Kwashiorkor</b>   | <b>Marasmus</b>   |
|--|---|
| Caused by deficiency of proteins   | Caused by deficiency of proteins and calories                                 |
| Enlargement of fatty liver cells   | No enlargement of fatty liver cells   |
| Ribs are not very prominent  | Ribs becomes very prominent   |
| Usually occurs in children of 1-3 years  | Usually occurs in children under 1 year                                       |
| Other symptoms: large pot like belly, stunted growth, swelling limbs, skin diseases, mental retardation and diarrhoea. | Child becomes so thin that loose folds of skin can be seen all over the body. |

## Practice Questions

1. James performed the following experiment:
- A mixture of starch and acid is allowed to stand for 5 minutes.
  - It is boiled in a bath for 15-20 minutes.
  - Then, 2 drops of Benedict's reagent are added to the test tube.
- After performing the above steps, what will James observe?

- No colour change is observed
- Orange red colour is observed
- Blue black colour is observed
- Pink colour is observed.

2. Consider the following clues and identify the vitamin:

Clue 1: It makes skin and gums healthy.

Clue 2: It heals wounds quickly.

Clue 3: Orange, lemon and grapes are some sources of this vitamin:

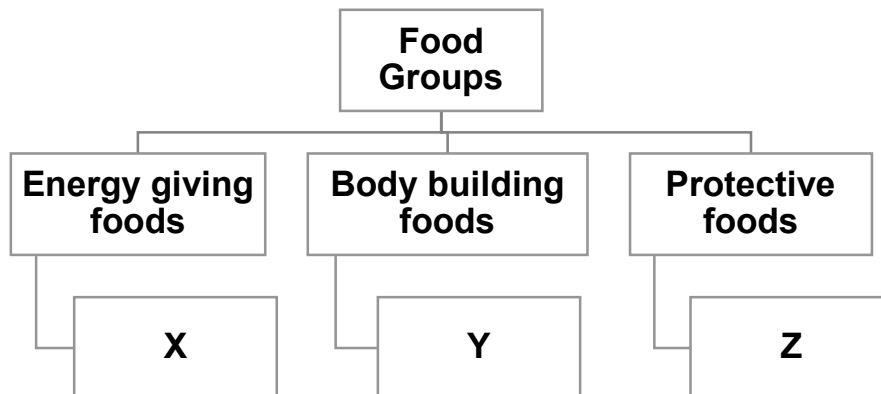
- Vitamin A
- Vitamin C
- Vitamin D
- Vitamin K

3. Match the following:

|    | Column I  |    | Column II                                    |
|----|-----------|----|--|
| P. | Iron      | 1. | For proper functioning of the nervous system |
| Q. | Calcium   | 2. | For maintaining water balance of the body    |
| R. | Potassium | 3. | For strong bones and teeth                   |
| S. | Sodium    | 4. | For the formation of haemoglobin             |

- P – 1, Q – 2, R – 4, S – 3
- P – 1, Q – 2, R – 3, S – 4
- P – 4, Q – 3, R – 2, S – 1
- P – 1, Q – 3, R – 4, S – 2

4. Consider the following classification of food groups and identify X, Y and Z:



- X – Rice, Y – Egg, Z – Spinach
- X – Spinach, Y – Almond, Z – Guava
- X – Maize, Y – Tomato, Z – Rice
- X – Milk, Y – Almond, Z – Meat

5. Consider the following statements and choose the correct option:  
 Statement I: Benedict's solution is used to test the presence of sugars in a food sample.  
 Statement II: Carbohydrates are required in very small amount by our body.
- Statement I is correct but statement II is incorrect.
  - Statement I is incorrect but statement II is correct.
  - Both the statements are correct.
  - Both the statements are correct.
6. Which of the following statements is/are correct?
- When we eat more carbohydrates than our body requirement, they are converted into fats.
  - Food rich in proteins help our body to grow.
  - Vitamin D is synthesised in the presence of sunlight.
  - All of the above
7. Which of the following is mismatched?
- |                        |                       |
|------------------------|-----------------------|
| a. Anaemia – Iron      | b. Goitre – Iodine    |
| c. Rickets – Vitamin E | d. Scurvy – Vitamin C |
8. Which of the following statements is/are true regarding vitamin D?
- It builds strong bones and teeth.
  - Fish-liver oil, milk and butter are sources of vitamin D.
  - Deficiency of this vitamin causes Pellagra.
  - It causes night blindness.
- |             |                  |
|-------------|------------------|
| a. Only I   | b. Only II       |
| c. I and II | d. I, II and III |
9. Choose the correct option and complete the following sentences:
- Food rich in carbohydrates is \_\_\_I\_\_\_.
  - Milk is a rich source of protein, \_\_\_II\_\_\_ and \_\_\_III\_\_\_
  - Butter is a rich source of \_\_\_IV\_\_\_.
  - Food rich in roughage is \_\_\_V\_\_\_.
- I – rice, II – vitamin D, III – calcium, IV – fats, V – spinach
  - I – orange, II – vitamin C, III – calcium, IV – carbohydrates, V – carrot
  - I – bread, II – vitamin C, III – vitamin D, IV – fats, V – spinach
  - I – pea, II – roughage, III – calcium, IV – fats, V – meat

10. Complete the following table:

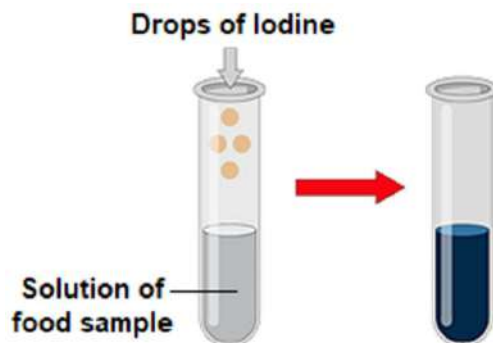
| Vitamin/mineral | Deficiency disease | Symptoms                   |
|-----------------|--------------------|----------------------------|
| Vitamin A       | Night-blindness    | Poor vision                |
| P               | Goitre             | Swollen glands in the neck |
| Vitamin B       | Q                  | Weak muscles               |
| R               | Anaemia            | S                          |

- a. P – Iron, Q – Beriberi, R – Iodine, S – Weak muscles
- b. P – Iodine, Q – Beriberi, R – Iron, S – Weakness
- c. P – Phosphorus, Q – Scurvy, R – Iron, S – Weakness
- d. P – Iron, Q – Beriberi, R – Calcium, S – Weakness

11. All of the following may be associated with scurvy except:

- a. Loss of appetite and irritability
- b. Diarrhoea and fever
- c. Tenderness and swelling in legs
- d. First symptom is altered mental status

12. The figure shows a food test being carried out on a food sample. What nutrient present in the food sample caused the mixture to change colour?



- a. Proteins
- b. Fats
- c. Starch
- d. Sugar

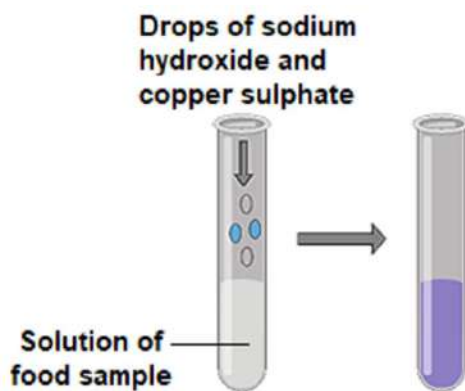
13. When is filter paper used in a food test?

- a. To separate lipids from a food solution.
- b. To test for lipids in a solid food sample.
- c. To test for proteins in a solid food sample.
- d. To test for starch in a food solution.

14. Richard carries out food tests on a sample of food. The results are shown in the table below. Using the table, deduce which nutrients are present in the food she is testing:

| Test        | Iodine                      | Benedict's                         | Biuret                            | Ethanol   |
|-------------|-----------------------------|------------------------------------|-----------------------------------|---|
| Observation | Food solution turns yellow. | Food solution stays a blue colour. | Food solution turns purple/lilac. | Cloudy appearance is observed when added to water |

- a. Lipid and starch  
 b. Sugar and starch  
 c. Protein and sugar  
 d. Protein and lipids
15. Which of the following is necessary for blood clotting and maintenance of teeth and bones?
- a. Calcium  
 b. Iodine  
 c. Copper  
 d. Chromium
16. The figure shows a food test being carried out on a food sample. What nutrient present in the food sample caused the mixture to change colour?



- a. Fats  
 b. Proteins  
 c. Starch  
 d. Carbohydrates
17. Consider the following statements and choose the correct option:  
 Statement I: Anaemia is caused due to the deficiency of iodine.  
 Statement II: Night blindness is caused by the deficiency of vitamin A.
- a. Statement I is correct but statement II is incorrect.  
 b. Statement I is incorrect but statement II is correct.  
 c. Both the statements are correct.  
 d. Both the statements are correct.

18. Which of the following provides double the energy provided by carbohydrates in human body?
- a. Fats  
b. Proteins  
c. Vitamins  
d. Minerals
19. Choose the correct option and complete the following sentences:
- i. \_\_\_\_\_ is essential for healthy red blood cells and a deficiency might cause anaemia.  
ii. \_\_\_\_\_ is most important for healthy vision.
- a. i – Iodine, ii – Vitamin A  
b. i – Fats, ii – Vitamin B  
c. i – Vitamin A, ii – Vitamin k  
d. i – Iron, ii – Vitamin A
20. Which of the following has no fat, sugar or oil?
- a. Milk  
b. Ice cream  
c. Coffee with cream  
d. Lemonade

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