

## SCIENCE Workbook



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





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## **CREST Science Olympiad Workbook for Grade 6**

#### **Fourth 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. Our team will make an effort to work on those suggestions. The status of the improvements can be checked at https://www.crestolympiads.com/corrections-class6-726

CREST Olympiads is one of the largest Olympiad Exams with students from more than 60 countries. The objective of these exams is to build a 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 is a previous year's 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



## **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

Carbohydrates	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.				
	Sugar is the sweet substance. Common sugar we use is sucrose and it is				
	obtained from sugar cane.				
	Food rich in carbohydrates are also known <b>as energy-giving food</b> .				
Fats	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.				
Proteins	Proteins are known as <b>body-building food</b> as they help in body growth				
	and repair of damaged parts of the body.				
	Animal sources of proteins include eggs, fish, meat, milk, cheese. Plant				
	sources of proteins include pulses of beans.				
Vitamins	Vitamins and minerals are collectively called protective food as they				
	protect us from many diseases. Different types of vitamins are A, B, C, D,				
	K, E.				
Minerals	Minerals are required in small quantities. Minerals include sodium, calcium,				
	potassium, iodine and phosphorous.				
Roughage Roughage is mainly provided by plant products such as fruits, w					
	pulses and vegetables in our food. It helps prevent constipation.				
Water	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:

Vitamin and Sources	Functions	Deficiency Diseases	
Vitamin A Sources - Mangoes,	Maintains healthy bones,	Colour blindness, night	
leafy green vegetables, oranges,	skin, tissue and teeth	blindness	
pumpkin, sweet potatoes			
Vitamin B1 (thiamine) Sources -	Helps in functioning of	Beriberi- loss of appetite,	
Eggs, meat, dried herbs, sunflower	digestive and nervous	loss of weight.	
seeds, whole grain cereals, milk	system		
Vitamin B <sub>2</sub> (riboflavin) Sources -	Maintains body growth	Skin disorders, Cheilosis-	
Eggs, almonds, bananas, green	and RBCs i.e., Red Blood	breaking of lips	
vegetables, milk, dried spices, fish	Cells, keeps skin and		
and meat	mouth healthy		
Vitamin B <sub>12</sub> (cyanocobalamin)	Helps in maintenance of	Pale skin, Anaemia, less	
Sources - Animal products like	central nervous system	stamina and less appetite.	
meat, fish, liver, eggs and milk	and RBCs		
Vitamin C Sources - Citrus fruits	Keeps gums, teeth and	Scurvy i.e., gum disease	
like papaya, oranges, tomatoes,	joints healthy. Builds	(gingivitis).	
strawberries, guava	resistance to infections		
Vitamin D Sources - Sunshine,	Necessary for the healthy	Rickets and Osteomalacia	
mushrooms, liver, fish and eggs	development of bones and	- weakening and softening	
	teeth	of bones.	
Vitamin K Sources - Green leafy	Essential for blood	Excessive bleeding from	
vegetables, soyabean oil,	coagulation	wound.	
tomatoes, egg yolk			

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

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

Kwashiorkor	Marasmus
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	Child becomes so thin that loose folds of skin
growth, swelling limbs, skin diseases, mental	can be seen all over the body.
retardation and diarrhoea.	

#### **Practice Questions**

- 1. James performed the following experiment:
  - i. A mixture of starch and acid is allowed to stand for 5 minutes.
  - ii. It is boiled in a bath for 15-20 minutes.
  - iii. Then, 2 drops of Benedict's reagent are added to the test tube.

After performing the above steps, what will James observe?

- a. No colour change is observed
- b. Orange red colour is observed
- c. Blue black colour is observed
- d. Pink colour is observed.
- 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:
  - a. Vitamin A

- b. Vitamin C
- c. Vitamin D d. Vitamin K
- **3.** Match the following:

	Column I		Column II
Ρ.	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

- a. P-1, Q-2, R-4, S-3
- c. P 4, Q 3, R 2, S 1

b. P - 1, Q - 2, R - 3, S - 4d. P - 1, Q - 3, R - 4, S - 2 4. Consider the following classification of food groups and identify X, Y and Z:



- a. X Rice, Y Egg, Z Spinach
- b. X Spinach, Y Almond, Z Guava
- c. X Maize, Y Tomato, Z Rice
- d. X = Milk, Y = Almond, Z = Maav
- 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.
  - 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.
- 6. Which of the following statements is/are correct?
  - a. When we eat more carbohydrates than our body requirement, they are converted into fats.
  - b. Food rich in proteins help our body to grow.
  - c. Vitamin D is synthesised in the presence of sunlight.
  - d. 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?
  - I. It builds strong bones and teeth.
  - II. Fish-liver oil, milk and butter are sources of vitamin D.
  - III. Deficiency of this vitamin causes Pellagra.
  - IV. It causes night blindness.

a.	Only I	b.	Only II
c.	I and II	d.	I, II and III

#### Food and its Components

- 9. Choose the correct option and complete the following sentences:
  - i. Food rich in carbohydrates is \_\_\_\_I\_\_\_.
  - ii. Milk is a rich source of protein, \_\_II\_\_\_ and \_\_\_III\_\_\_\_
  - iii. Butter is a rich source of \_\_IV\_\_\_.
  - iv. Food rich in roughage is \_\_\_\_V\_\_\_\_.
  - a. I rice, II vitamin D, III calcium, IV fats, V spinach
  - b. I orange, II vitamin C, III calcium, IV carbohydrates, V carrot
  - c. I bread, II vitamin C, III vitamin D, IV fats, V spinach
  - d. 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
Р	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
- c. Starch

- 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	lodine	Benedict's	Biuret	Ethanol
Observation	Food solution	Food solution	Food solution	Cloudy appearance
	turns yellow.	stays a blue	turns	is observed when
		colour.	purple/lilac.	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
- c. Copper

- b. lodine
- 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
- c. Starch

- b. Proteins
- d. Carbohydrates
- 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

c. Vitamins

- b. Proteins
- 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
- c. Coffee with cream

- b. Ice cream
- d. Lemonade

