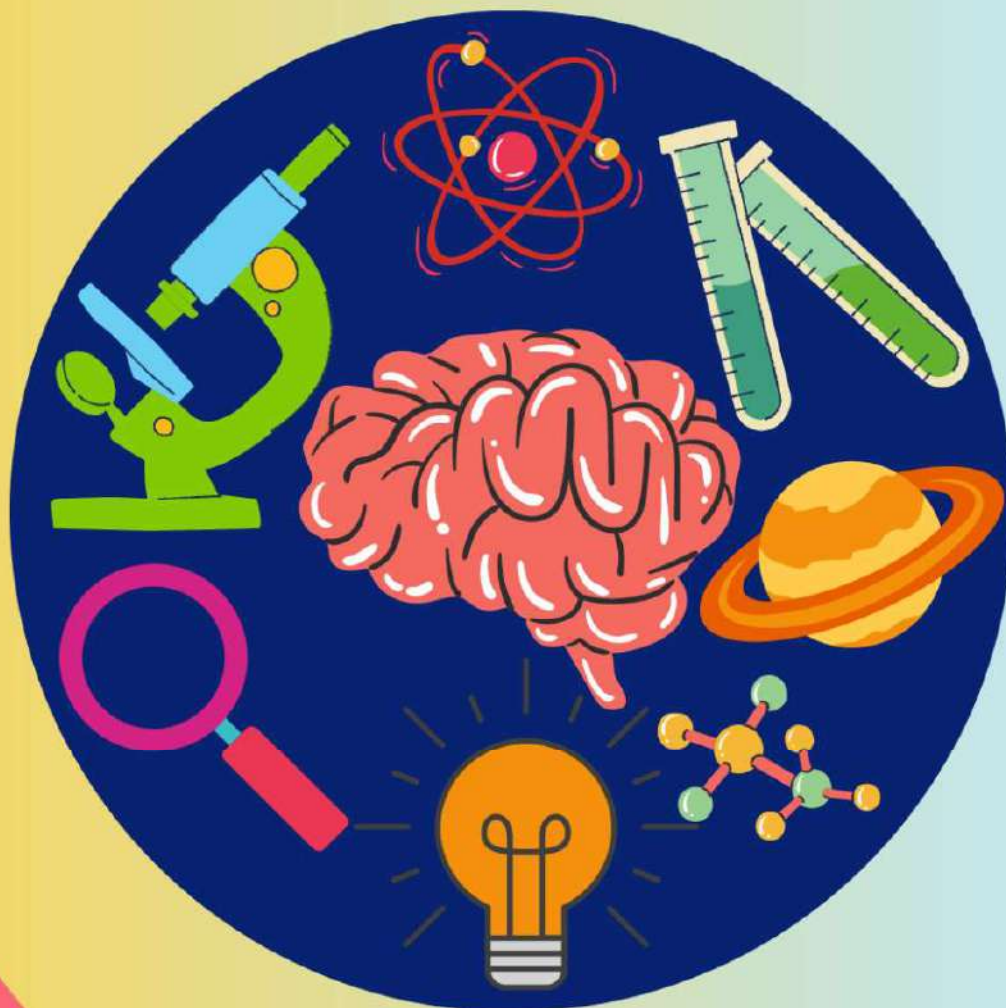


# SCIENCE WORKBOOK

4

For the preparation of National  
& International Olympiads



- Chapter-wise practice exercises
- Previous year paper

# Science Olympiad

## Exams Preparation Book

CSO | NSO | USO | iOS | NSTSE | HSO

**Grade 4**



#CRESTInnovator

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## CREST Science Olympiad Workbook for Grade 4

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).

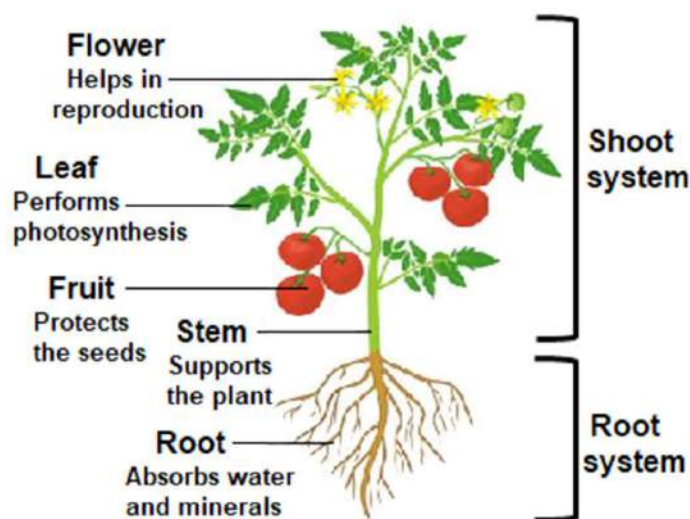
CREST Olympiads is one of the largest Olympiad Exams with students from more than 25 countries. The objective of these exams is to build competitive spirit while evaluating students on conceptual understanding of the concepts.

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*

There are many plants around us. Some are big while some are small. A plant has two main parts- the root and the shoot.

- **Root** – The part of the plant that grows under the ground is called the root.
- **Shoot** – The upper part of the plant that bears stem, branches, leaves, buds, flowers, and fruits is called shoot.

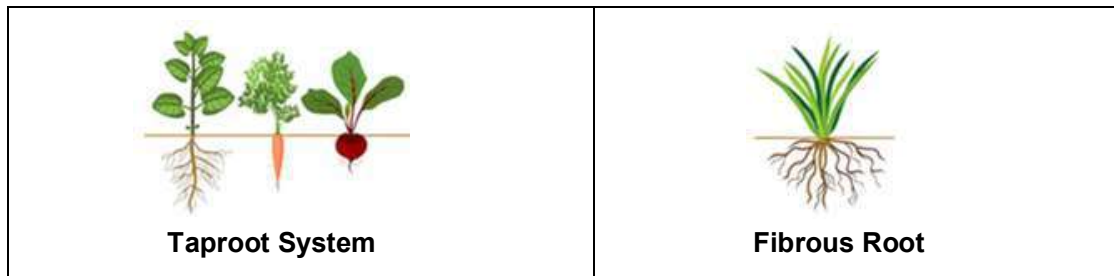


## Root System

Roots give support to the plant and absorb water, minerals, and nutrients from the soil for the plant. They hold the plant firmly to the soil. We eat the roots of carrot, radish, beetroot, turnip, and sweet potato.

Plants have two main types of roots –

Tap Root	Fibrous Root
The main root that grows from the base of the stem is called a tap root. Many small roots grow from the main root laterally. Pea, sunflower, mustard, and carrot have tap roots.	A bunch of roots of nearly equal size that grows from the base of the stem is called a fibrous root. It does not have a main root. Grass, onion, rice, and wheat have fibrous roots.



## Shoot System

### Stem

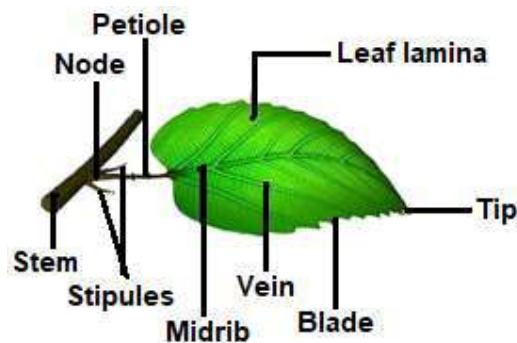
Stem is the main part of the shoot. It bears branches, leaves, buds, flowers, and fruits. Some plants have a very hard, thick, and woody stem called the trunk. Different plants have different types of stems.

- a. Tall, big with hard and thick brown stems called **trees** have many branches and stand erect. Trees, like coconut tree, banyan tree etc., have very strong stems.
- b. **Shrubs** like bougainvillea, jasmine, hibiscus and rose are smaller than trees and have soft and woody stems. They are medium in size and live for several years. Shrubs grow bushy as the branches are grown near the ground level.
- c. **Herbs** such as basil, mint and coriander have soft and green stems. They are short in size and can only survive for one or two seasons.
- d. **Creepers and Climbers** have very weak stems. These stems cannot hold the plant upright. Creepers like watermelon and pumpkin grows along the ground and climbers like grapevine, pea plant and money plant need support of other plants, sticks or walls to stand straight.

Stems help to keep the plant straight and upright. It helps in carrying water from the roots to the leaves and food from the leaves to the different parts of the plant. We eat the stems of potato, ginger, turmeric, and sugarcane.

### Leaf

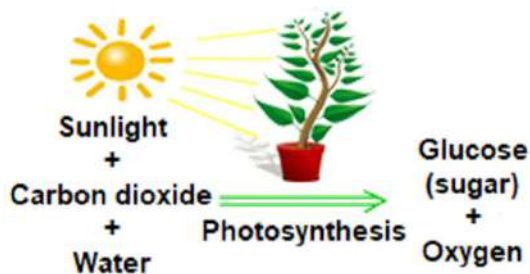
Leaf prepares food for the plant. The leaf is also known as the food factory of the plant. They are of different shapes and sizes.



## Leaf Structure

1. **Leaf blade:** It is the flat broad surface of the leaf. It traps the maximum amount of sunlight.
2. **Midrib:** The midrib or the main vein is the line that runs along the centre of the leaf blade. The veins are small tubes that supply water brought by the stem and branches to all the parts of the leaf.
3. **Stomata:** The leaves have minute pores or openings called stomata. There are more stomata on the lower surface of the leaf which is clearly visible under the microscope. Stomata helps in the gaseous exchange for the photosynthesis process.
4. **Petiole:** The petiole or the leaf stalk attaches the leaf blade to the stem. It helps in the supply of food and water, similar to the stem.
5. **Stipule:** They are small leaf-like pair that are found at the base of the petiole of many flowering plants.

## Photosynthesis



The process by which leaves make their own food is called **photosynthesis**. 'Photo' means light and 'synthesis' means to put together.

Green plants make their own food with the help of the green pigment in leaves called chlorophyll.

When sunlight falls on the leaves the energy from the sun is absorbed by chlorophyll.

Water is absorbed by the roots of the plant and carried by the stem to the leaves.

Carbon dioxide is taken in by the tiny openings present on the surface of the leaf called stomata.

The end product of Photosynthesis process is oxygen and water that exit from the surface of the leaves through the stomata. Food prepared by the leaf is stored as simple sugar or glucose. The excess sugar is converted into starch and stored in different plant parts. Water loss from the leaves is called **transpiration**.



## Products Obtained from Plants

1. We get different kinds of food from plants like fruits, vegetables, and nuts.
2. Plants give us cereals and pulses. These are dry seeds of some plants which we use as food.
3. We get tea, coffee, cocoa, and sugar from plants.
4. We get many types of spices like cardamom, cinnamon, pepper etc. from plants.
5. We get different kinds of oils from plants and medicines as well. Plants like neem, eucalyptus etc. are used for making medicines.
6. We get different kinds of fibres from plants like cotton, jute etc.
7. Plants give us paper, rubber, and gum. We get paper from bamboo plant and gum from acacia tree and rubber from rubber tree.
8. Plants give us wood to make furniture, some plants are used to make perfumes, soaps, and toothpaste.

## Adaptations in Plants

Plants grow everywhere- on mountain slopes, in deserts, on ocean beds, in plains and in river valleys. They adapt themselves to the place they live in.

Plants that grow on the land are called terrestrial plants and plants that live in water are called aquatic plants. We find different kinds of plants in different natural surroundings. Plants adjust to their surroundings by making a few changes in themselves. The natural process by which plants adjust to their surroundings is called adaptations.

## Terrestrial Plants

There are different types of terrestrial plants:

### 1. Plants on the Hills or Mountains



Fir



Deodar



Pine

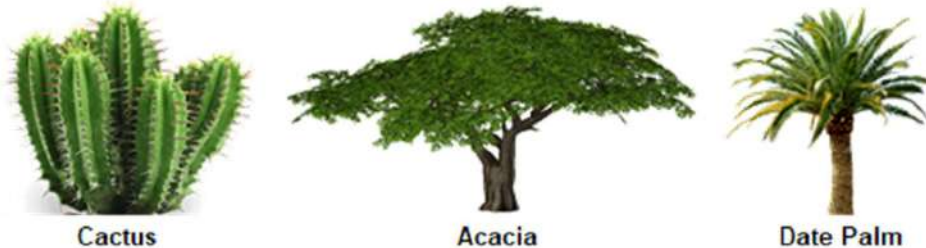
- These plants tall and straight.
- They are of conical shape.
- They have narrow and needle-shaped leaves with waxy coating on them.
- The conical shaped trees do not allow snow to get deposited on them and the waxy coating prevents the loss of water. The trees that bear cones instead of flowers are called conifers and coniferous trees. Example, Pine and Fir.

## 2. Plants in Plains:



- In the plains, the plants can bear the heat and give shade in summer. These plants growing in plains have more space. They have lots of branches and leaves. Their leaves are flat. Trees shed their leaves in winter.
- They receive sufficient rainfall.
- Examples- Mango, Banyan, Sal, Rosewood

## 3. Plants in Deserts:



- These are the areas that receive scanty or no rainfall.
- These are dry and sandy areas that have hot weather.
- Most of the plants found in these regions are thorny.
- Examples- Cactus, Acacia and Date palm.
- Adaptations – The leaves of cactus plant are modified into spines to reduce the loss of water. The stem is green and fleshy and it contains chlorophyll. It prepares food for the plant and stores food and water.

## 4. Plants in Marshy Areas:



- Near the seashore where the river enters the sea, lie the marshy areas. In marshy lands, the soil is clayey and covered with water. The plants that grow here are called mangroves. These plants are adapted to live in the soil that is soaked in water.

- These plants have roots that grow above the soil. Since the soil is full of water, the roots do not get air to breathe. Roots grow out of the soil surface to breathe. Such roots are called breathing roots or pneumatophores.

Some of the trees which grow in plains shed their leaves in autumn or winter. Trees that shed their leaves in autumn are called **deciduous trees**. These trees have a lot of branches. For example, Teak, Sal, Maple.

Trees that do not shed their leaves are called **evergreen trees**. They have many leaves and remain green throughout the year. Mahogany and Rosewood are examples of evergreen trees.

## Adaptations in Aquatic Plants

Plants growing in water are called aquatic plants. Aquatic plants can be categorized into three groups:

1. **Floating Plants** – They are small and light weight. They are usually spongy. Their roots are not fixed to the soil, so they float on water. Duckweed, water lettuce and water hyacinth are three floating plants.



Duckweed



Water Hyacinth

2. **Fixed Plants** – Some plants like lotus and water lily have roots fixed in the mud at the bottom of the pond. Their thin, long, hollow, and flexible stems support the large leaves and flowers that float on the surface of the water. Leaves are broad and have wax coating. The stomata are present on the upper surface of the leaf that help in exchange of gases easily.



Lotus



Water lily

3. **Underwater Plants** – Some plants like hydrilla, tape grass, and pondweed grow under water. Their roots are fixed to the soil or the bottom of shallow ponds and rivers. These plants have long, ribbon-like narrow leaves. Their leaves have no stomata at all. These underwater plants breathe through their body surface.



**Tape grass**



**Hydrilla**

## Some Unusual Plants

There are some plants which eat insects. They are called insectivorous plants. Some plants grow in the soil which is poor in mineral. So, they eat insects to get enough nutrition. The leaves of the Venus Flytrap are like a trap. They can snap shut when an insect sits on them.















**Pitcher plant**



**Venus flytrap**

## Seed Dispersal

Seed dispersal is the method by which a plant scatters its offspring away from the parent plant. Seeds need to be dispersed to have the best chance of growing into a new plant and reduce the competition for space, light, nutrients, and water.

Wind	Animals	Water	Bursting
Milkweed 	Beggar-ticks 	Lotus 	Violet 
Dandelion 	Sandbur 	Coconut 	Jewelweed 
Maple 	Blackberry 	Cattail 	Witch hazel 

## Practice Questions

1. Find the ODD one out from below given group of trees:



Deodar



Sal



Rosewood



Banyan

2. Select the odd one out:



Sundew



Bougainvillea



Pitcher



Venus flytrap

3. In the pictures given below we can see the seeds of dandelion and orchid. Identify the agent of seed dispersal from the given options.



Dandelion



Orchid







a. Wind

c. Fruits burst with a sudden jerk

b. Animals

d. Water

4. Look at the given classification table. Select the option that correctly identifies the headings M and N:

<b>M</b>	 <b>Grapevine</b>	 <b>Pea</b>	 <b>Money Plant</b>
<b>N</b>	 <b>Pumpkin</b>	 <b>Muskmelon</b>	 <b>Watermelon</b>

- a. M – Herbs, N – Trees  
 b. M – Climbers, N – Creepers  
 c. M – Shrubs, N – Herbs  
 d. M – Climbers, N – Trees
5. Search the name of a free-floating aquatic plant from the wonder box given below:

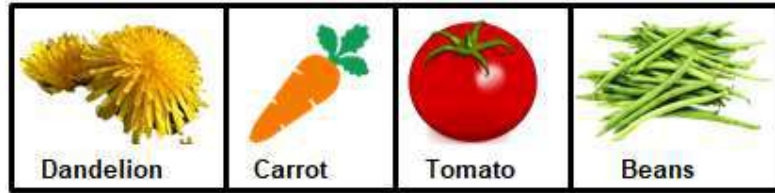
D	M	E	D	W	T	R	S	V
O	G	A	C	E	L	U	N	K

- a. Water lily  
 b. Duckweed  
 c. Lotus  
 d. Mangrove
6. Complete the table given below about the adaptation of plants:

	<b>Name of the Plant</b>	<b>Place Adapted to</b>	<b>Type of Leaf</b>
A.	Cactus	Desert	?
B.	Banyan	Plains	?

- a. A – Needle like with wax coating, B – Modified into cones  
 b. A – Modified into spines, B – Flat and thin  
 c. A – Broad and fleshy, B – Needle like with wax coating  
 d. A – Flat and thin, B – Long, narrow and ribbon-like
7. In the following four groups of plant parts that we eat, one member is the ODD one out. Select the option in which the odd member is underlined INCORRECTLY:
- a. Sweet potato, Radish, Turnip, Brinjal  
 b. Cabbage, Mint, Tomato, Spinach  
 c. Mango, Guava, Pear, Corn  
 d. Ginger, Asparagus, Cucumber, Turmeric

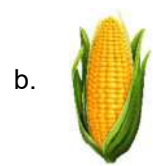
8. Students have a pack of cards to organise into groups. Each card has a picture of a different object. The cards that belong to group are shown below:



Which picture card would best be placed in the given group?



Rice



Corn

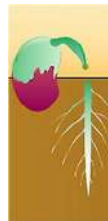


Grass



Fir

9. The image given here shows a plant when it starts to grow. Under normal conditions, which of the following will be the next to develop as the plant continues to grow?



- |                    |                     |
|--------------------|---------------------|
| a. Seed and stem   | b. Fruit and flower |
| c. Leaf and flower | d. Stem and leaves  |

10. Study the given relationship based on the seed dispersal method and select the option that satisfies the same relationship:

**Pea: Poppy**

- |                   |                       |
|-------------------|-----------------------|
| a. Balsam: Bean   | b. Burdock: Dandelion |
| c. Coconut: Lotus | d. Cocklebur: Maple   |

11. Select the correct option from below which on unscrambling gives the name of an insectivorous plant:

- a. U W S N D E
- c. C R E P S U

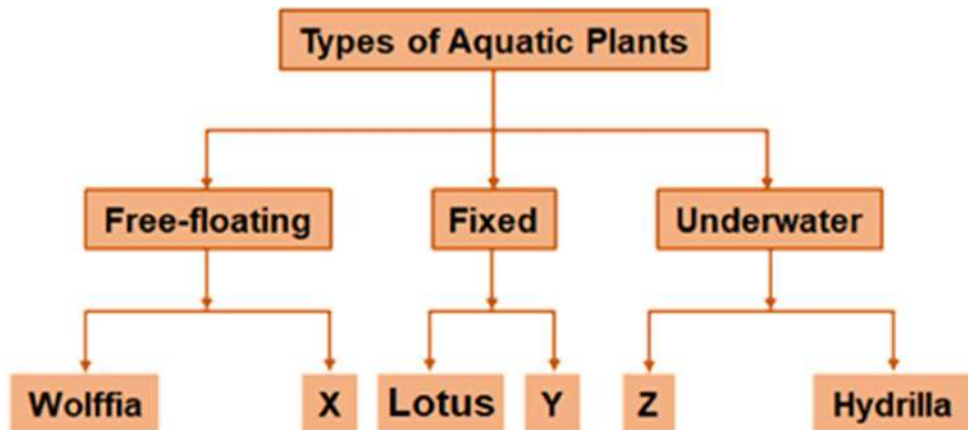
- b. A H L I D Y L R
- d. E D O D R A

12. Which of the following pairs are wrongly classified?

- D: Jasmine – Toothpaste
- E: Bamboo plant – Paper
- F: Rosewood – Perfume
- G: Eucalyptus plant – Medicine

- a. D and F
- b. E and G
- c. D and E
- d. F and G

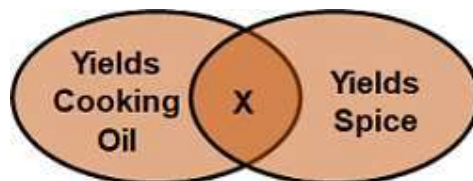
13. Study the given classification chart carefully and select the option which contains the aquatic plants that can be placed at X, Y and Z:



- a. X – Pistia, Y – Seaweed, Z – Water lily
- b. X – Lotus, Y – Water hyacinth, Z – Pondweed
- c. X – Water lettuce, Y – Water lily, Z – Tape grass
- d. X – Seaweed, Y – Duckweed, Z – Pond weed

14. Refer to the given Venn diagram.

The plant X can be \_\_\_\_\_.



- a. Mustard
- b. Coriander
- c. Clove
- d. Both a and c

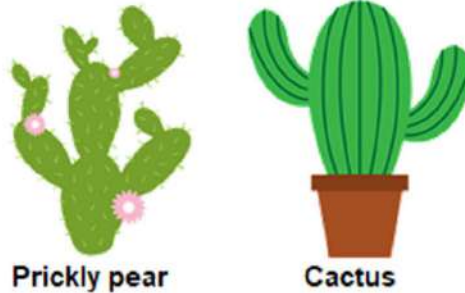


15. Mountain regions are cold.

Which of the following adaptations is not shown by plants that grow in mountainous regions?

- a. The trees are tall, straight, and thin.
- b. The trees are conical in shape.
- c. The leaves have waxy coating.
- d. The leaves are broad and fleshy.





16. Look at the pictures of two different plants given below.



Which of the following characteristic is common to all the above two plants?

- a. Their leaves have a wax coating.
- b. Their spines have a few stomata to prevent the loss of water.
- c. Their stems are green and help to prepare their own food.
- d. Both a and c

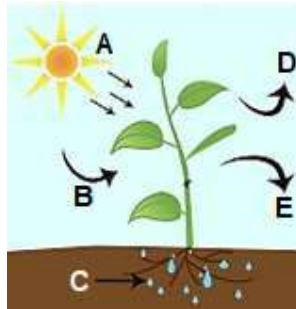
17. Which of the following shows the correct match of seed and its mode of dispersal?

a.	Cocklebur		Animal
b.	Dandelion		Water
c.	Blackberry		Explosion
d.	Coconut		Wind

18. Consider the two statements and choose the correct option:  
 Statement I: The leaf blade traps the maximum amount of sunlight.  
 Statement II: The stipule is the part of the leaf that attaches the leaf blade to the stem.

- a. Statement I is correct, and statement II is incorrect.
- b. Statement I is incorrect, and statement II is correct.
- c. Both the statements are correct.
- d. Both the statements are incorrect.

19. Look at the picture related to photosynthesis given below carefully.  
 It is seen that part labelled B is carbon dioxide that enters the leaf and part labelled D is oxygen that is the end product of photosynthesis process.



Which of the following helps in the above exchange of gases?

- a. Leaf blade
- b. Midrib
- c. Veins
- d. Stomata

20. Refer to the given word grid.  
 Which of the following is NOT hidden in the given word grid?

L	E	A	F	S	U	P
S	T	A	R	L	F	Y
G	L	U	C	O	S	E
M	O	O	N	D	H	G
E	A	R	U	O	I	Z
O	X	Y	G	E	N	X

- a. The food factory of the plant.
- b. The main vein that runs along the centre of the leaf.
- c. In the process of photosynthesis, the food prepared by plants which is a kind of sugar.
- d. The gas that is given out in the photosynthesis process.