

1. THE SIGN OF LIFE

1. The abiotic factors which are required for the existence of life ?
Sunlight, Air, Water, Soil etc.

2. The chief sign of life ?

Metabolism. (All the synthesis as well as the breaking down processes occur with in the cell)

[Anabolism + Catabolism = Metabolism.]

Anabolism ? The process of assimilation of available materials and there by synthesis of new substances.

Eg:- Photosynthesis, Protein synthesis.

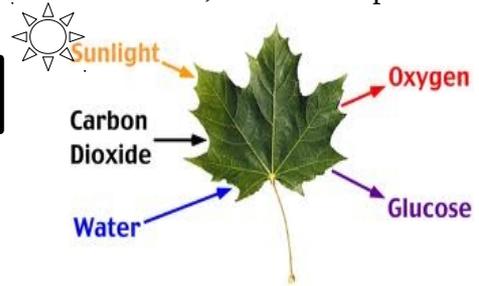
Catabolism ? The process of releasing energy by the breakdown of nutrients. Eg:- Respiration.

3. The source of energy in the biosphere ?

Sun.

4. Define photosynthesis.

The process of making food by green plants from water and carbon di oxide, with the help of sunlight.



5. Factors needed for photosynthesis ?

- * sunlight * chlorophyll
- * water * carbon di oxide.

Sunlight is utilized for breaking water molecules in to hydrogen and oxygen.

Chlorophylls absorb sunlight.

Water and CO₂ are used as the raw material for synthesising food (glucose).

6. The organ of photosynthesis ? The kitchen of the biosphere ?

Leaf.

7. How do water and carbon di oxide reach the leaves ?

From the soil, water enters to the root hairs and then to xylem vessels through osmosis so as to reach the leaves. CO₂ reaches the leaves through the stomata by diffusion.

8. The pigments that can absorb sunlight ?

Mainly **Chlorophyll a** (bluish green).

The accessory pigments like **Chlorophyll b** (yellowish green), **Xanthophyll** (yellow) and **Carotene** (yellowish orange) absorb solar energy and transfer it to the chlorophyll a.

9. Chlorophyll a and chlorophyll b absorb mainly the ---- and ---- rays in the visible light.

Blue and red rays.

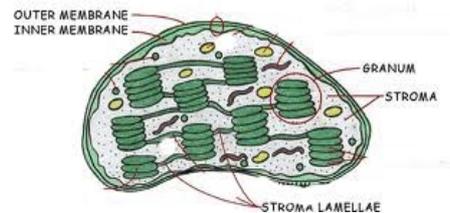
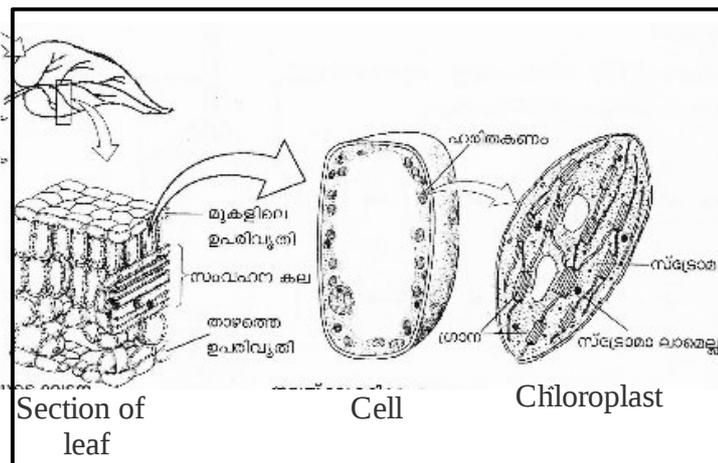
10. Leaves appear green. Why ?

Chlorophylls can not absorb the green rays and hence green is reflected back so as to appear leaves green.

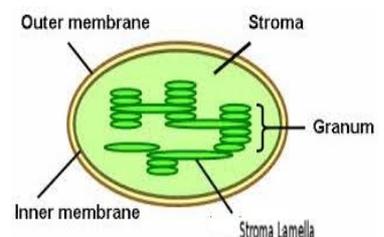
11. Structure of the chloroplast ?

Each chloroplast is a double layered cell organelle containing many chlorophyll. A fluid called **stroma** seen inside the chloroplast with **lamellae** embedded in it.

The aggregated lamellae are the **grana**.



chloroplast



12. Plants use only less than ----- percentage of solar light that fall on it.
(5%)

13. What is **chemosynthesis** ?

The process of making energy by certain organisms with out the help of solar energy.
(Sulphur bacteria can produce energy by oxidising the inorganic compound H_2S)

14. The chlorophyll like pigment presented in autotrophic bacteria ?

Bacterio chlorophyll. (This pigment absorbs the infra-red rays of the sun)

15. Phases of photosynthesis ?

a) – **Light Reaction (The phase which requires light)**

Light energy is converted in to chemical energy (stored as ATP molecules) and utilising this energy water molecules are broken down in to hydrogen and oxygen.

Light reaction occur inside the grana of chloroplast.

During this phase, O_2 is released.

b) – **Dark Reaction (The phase which does not require light)**

Hydrogen combines with CO_2 to form glucose (carbohydrate).

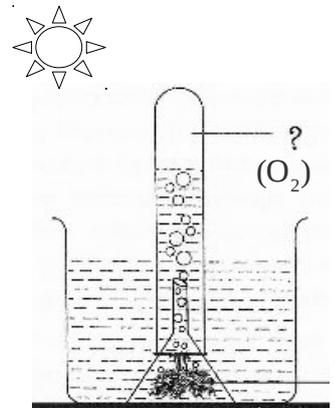
This phase do not require light and takes place in the stroma of chloroplast.

16. Suggest an experiment to prove the release of oxygen molecules during photosynthesis.

Take a piece of aquatic plant like hydrilla in a glass tumbler filled with water. Cover the plant using a transparent funnel. Cover the tail portion of the funnel by a test tube filled with water. Take care to leave a little portion of the tube devoid of water (see the figure)

Keep this device under sunlight for one hour. Observe the air bubbles going upward.

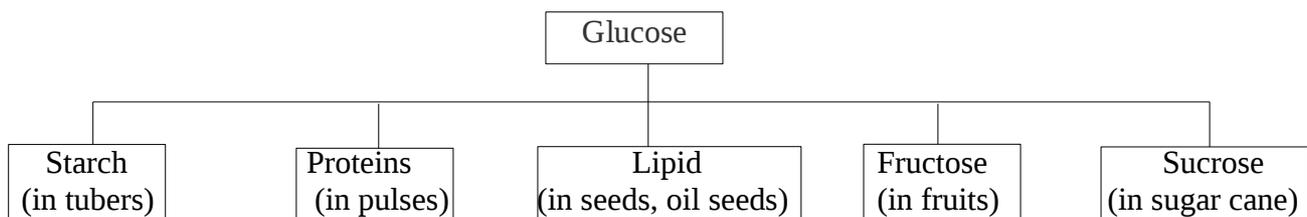
Lift the test tube gently above the water and place a glaring match stick towards the mouth of the test tube while the tube moves upward direction. The match stick glare brightly because of the presence oxygen.



17. Glucose, the product of photosynthesis, is converted in to starch. Why ?

Since glucose is readily soluble in water, it can not be stored. Hence it is converted in to insoluble starch.

Observe how the food (glucose) is stored in plants.



18. Design an experiment to prove the presence of starch (carbohydrate) in leaf.

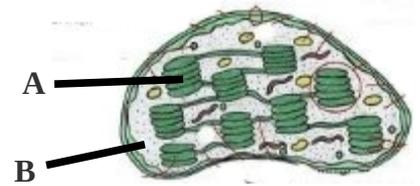
Collect a green leaf from a plant that was kept under sunlight for a few hours. To remove the green colour, treat the leaf with hot alcohol and boiling water. Apply a few drops of **iodine solution** on the colourless leaf. The leaf becomes **blue** because of the presence of starch.

(Conduct the same experiment on other leaf that was kept in a dark room for a few days. The colour do not change in to blue due to the absence of starch in it).

1. Catabolism : Respiration ; Anabolism : ----- ?
2. Water : Xylem ; CO₂ : -----?
3. ----- solution is used for starch test.
4. The ultimate energy source of the biosphere is ----- [Carbohydrate, Water, Sun]
5. The gas which comes out during photosynthesis ?
6. Fill up the blanks

Phases of photosynthesis	Process involved in it	Site of the process
Light reaction	-----A ----	With in the Grana
---- B ----	Carbohydrate is formed by the union of hydrogen and carbon di oxide	---- C ---

7. Chlorophyll does not absorb the ----- rays of the visible light.
8. Name any 2 pigments, which can absorb sun light, other than chlorophylls.



9. Sulphur bacterium is a ----- bacterium.
10. Name **A** and **B** of the given figure. Name this figure ? -----