

Subject	: Science
Grade	: 9
Term	: 2 <sup>nd</sup> Term
Competency	: Explores life and life processes in order to improve the productivity of biological systems
Competency level	: Investigates the plant growth substances
Unit	: Plant growth substances

Two activities are given below. It will be wiser to arrange the setup qualitatively as it is necessary to conduct both activities. Answer the questions based on the activities. It will take around three weeks to complete the whole activity and therefore obtain plants with a higher growth rate, high longevity.

#### Activity 1

Materials needed: Two potted plants, these two plants should be similar and of same species (Important: Obtain two plants of same species and plant them. Then, maintain for a period of time and use for the given activity.)

Method: 1. Cut and remove the apex (upper part) of one selected plant.  
 2. Then, measure the heights of both plants.  
 3. Measure and record the heights of both plants separately for 7 days.

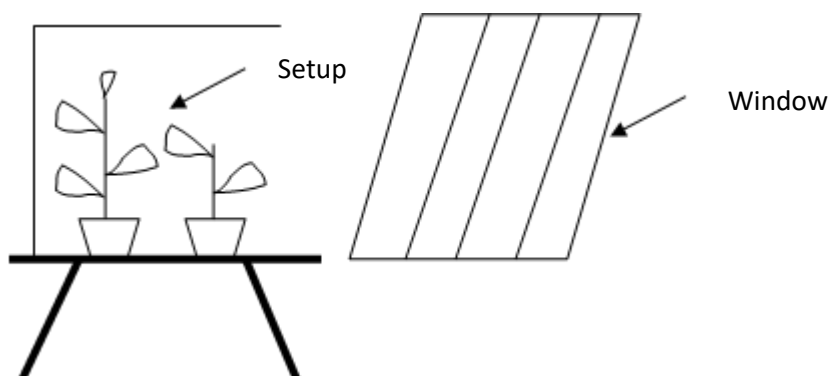
#### Activity 2

Materials needed: The two potted plants used for the activity 1, a cardboard box

(The two potted plants should be able to keep inside the box and there should be an opening at one side of the box.)

Method: Keep the two potted plants inside the box and keep it near a well-lit window in the house. Place the box so that, opening of the box will face the window.

Record the observations continuously for a week.



Answer the following questions based on the observations.

1. Is there an increase in height of plants used in activity 1?
2. In which plant were you able to see if there's an increase in height?
3. Which part of the plant is responsible for the increase in height?
4. Accordingly, what are the observations that you could arrive at?
5. Was there an increase in height in plants used in activity 2?
6. In which plant were you able to see if there's an increase in height?
7. What are the other observations from the activity 2?
8. What are the observations that you could arrive at based on those observations?

**Plants will grow towards the light and there is an effect of the apex for the growth of the plant. The chemical compounds synthesized at the apex of the plant have an influence on it. Such chemical compounds are known as plant growth substances. There are of two types as promoters and inhibitors. These promoters and inhibitors are naturally produced in trees and artificially produced plant growth substances are used in agriculture and in horticulture.**

**Promoters – promote the growth**

**Inhibitors – Inhibit the growth**

**Plant growth substances that promote the growth – Auxins, Gibberellins, Cytokinins**

**Auxins** – It is produced in the tips and shoots of the plants. Auxins, produced at the apex of the plant, diffuse downwards and speed up the growth of cells. As it speeds up the growth of new cells, it pushes the apex upwards. And also, Auxins move to the darker side of the plant. Therefore, the growth of cells in the darker side will be increased. This causes a curving of the plant stem tip. Moreover, auxins inhibit the growth of lateral buds and therefore, growth of lateral buds could not be seen in the presence of the apex. A fast growth of lateral buds could be observed when the apex is removed as it eliminates the effect of auxin.

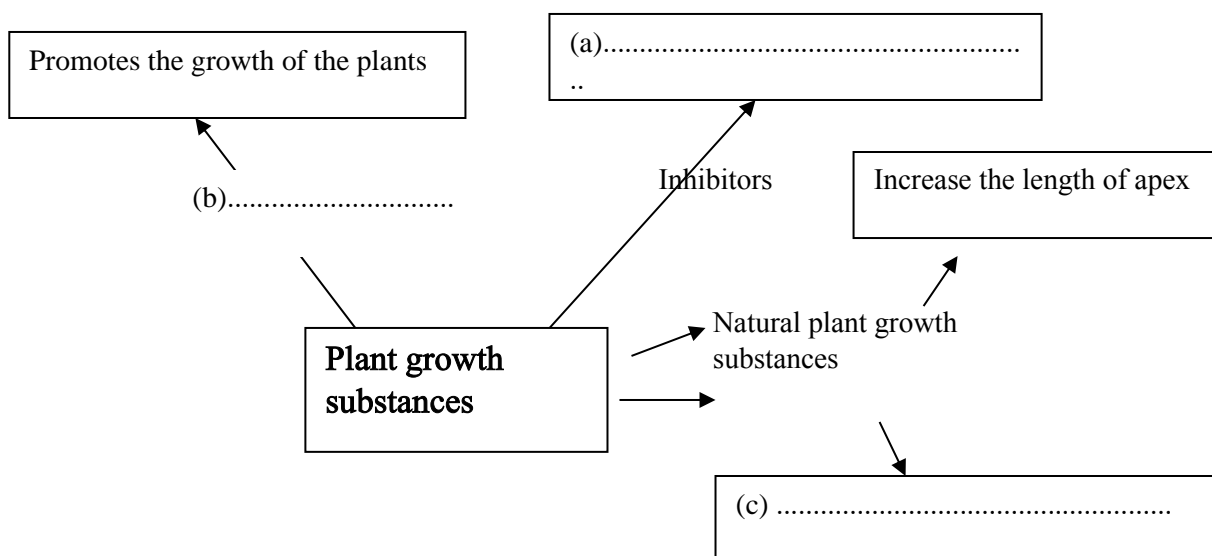
**The above phenomena were able to experience by engaging in 1<sup>st</sup> and 2<sup>nd</sup> activities.**

Gibberellins – Promotes the elongation of the stems and growth of fruits.

Cytokinins – Accelerates the cell division, Stimulate the seed germination, accelerates the growth of flowers, fruits, leaves and roots

- Artificial growth substances are frequently used in agriculture and in horticulture. These artificial growth substances are used as a weedicide for paddy fields, to induce root formation in stem cuttings, to get fruits in the off seasons and to get fruits quickly.
- Prepare a list of artificial growth substances.

Complete the following chart.



Answers for the questions in lesson “Plant growth substances”

1. Yes
2. The plant with the apex
3. Apex
4. Apex is important in increase in height of the plant.
5. Yes
6. The plant with the apex
7. Curving of the stem tip (apex) towards the window, Growth of lateral buds near the leaves in the plant in which the apex is removed/ occurring of lateral buds
8. Stem tip of the plant grows towards the light (a curving of the stem tip towards the light), Growth of lateral buds in the absence of the apex
  - a). Inhibit the growth of the plants/ decrease
  - b). Promoters
  - c). Root formation in stem cuttings, Control weeds