



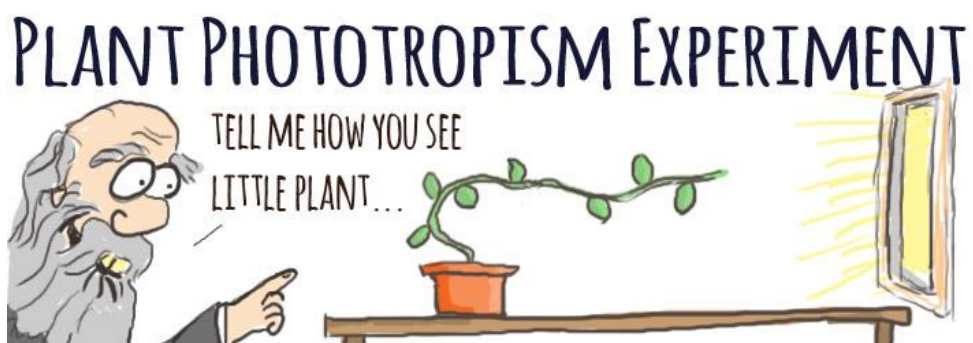
JENN

Training and Consultancy

The path to enlightened education

**SUBJECT: LIFE SCIENCES
GRADE 12
SCIENTIFIC INVESTIGATION
(PLANT RESPONSE TO THE ENVIRONMENT)
SPRING CLASSES
2023**

ANSWERS



ACTIVITY 1

- 1.1 Growth of plant shoots ✓ growth response/bending of the tip (1)
- 1.2 Auxins ✓ (1)
- 1.3 - Same environment in which the shoots are placed ✓/same intensity of the light
- Same type of shoot used ✓
- Same age of the shoot ✓(mark first 2) (any 2) (2)
- 1.4 (a) **In investigation A:**
- Light from the right ✓/from one side/unilateral light caused auxins to move to shaded side of the shoot ✓
- leading to increased cell elongation and division ✓ on the shaded side/There was therefore greater growth on the shaded side ✓
- thus bending the shoot in the direction of the source of light ✓ (3)
- (b) **In investigation C:**
- Since there is no light stimulus ✓ from the side (because of the cap) there is no influence on the distribution of auxins ✓/auxins evenly distributed below the cap (3)
- therefore the shoot grew upright ✓
- 1.5 - Repeat the investigation ✓ (2)
- Use more than one plant for each treatment ✓/increase sample size (2)

ACTIVITY 2

- 2.1 (a) Auxin concentration ✓ (1)
(b) Plumule growth ✓
- 2.2 For measurement of the plumule length ✓ (1)
- 2.3 - To simulate the same conditions ✓ under which germination takes place for the normal growth ✓ of the seedlings
- To expose the seedlings to uniform light ✓
so that no other variable is introduced/to ensure validity/ to allow upward growth of the plumule for easy measuring ✓
(MARK FIRST ONE ONLY) (Any 1 x 2) (2)
- 2.4 - They used seven seedlings in each group ✓/35 seeds in total/a large sample
- They calculated the average ✓ increase in plumule length
(MARK FIRST ONE ONLY) (Any 1) (1)

- 2.5
- Same species of beans✓
 - Seedlings of the same age✓
 - Seedlings of the same size✓
 - Same temperature✓
 - Identical apparatus (beakers/petri-dishes/graph paper/grid/volume of solution) ✓ (Any 3)
- (3)

(MARK FIRST THREE ONLY)

- 2.6 An increase in auxin concentration up to an optimum stimulates the growth rate of the plumule/stem. With further increase in auxin concentration there is an inhibition of plumule/stem growth ✓ (1)

ACTIVITY 3

- 3.1
- (a) Presence or absence of auxins✓/(position of) the stem tip (1)
 - (b) Growth✓/elongation of the stem (1)
 - (c) - Repeat the investigations✓
 - Increase the sample size✓/use more than one stem tip per investigation (2)
- 3.2
- To eliminate the influence of light✓on stem growth
 - therefore improving the validity of the results✓/in order to eliminate any other influencing factors (2)
- 3.3
- Because the tip was replaced on the left✓/one side of the shoot
 - auxins will accumulate on the left✓/that side
 - Cell elongation will be stimulated on the left✓/one side causing the stem to bend towards the right✓/other side (2 x 2) (4)

ACTIVITY 4

- 4.1 Stem growth✓ (1)
- 4.2
- To remove the source of auxins✓
 - The tip produces auxins✓ (Any 1) (1)
- 4.3 To increase the reliability✓/validity of the results (1)
- 4.4 B✓ and C✓ (2)
- 4.5
- The presence of auxins✓ in the tip of the stem
 - stimulate upward growth✓
 - and inhibit development of lateral branches✓ (3)
- 4.6
- (a) Gibberellins✓ (1)
 - (b) Absciscic acid✓ (1)

ACTIVITY 5

- 5.1 - So that the plant hormone✓/ auxins from the apical tip
- could diffuse into the block of agar jelly✓ (2)
- 5.2 - The stem stopped growing upwards✓
- Lateral branches developed✓ (2)
- 5.3 - (Lateral) branches develop✓
- that can bear more fruit✓/increased yield
OR
- Shorter trees✓ /development of lateral branches
- makes harvesting of fruit easier✓ Any (1 x 2) (2)
- 5.4 - Auxins✓in the block of agar jelly
- move downwards ✓into the stem
- causing (cell) elongation✓/growth resulting in
upward growth of the stem (3)

ACTIVITY 6

- 6.1 - High/low levels of abscisic acid in the seeds
inhibits/promotes germination✓✓
- **OR**
- Absciscic acid has no effect on germination✓✓
- **OR**
- Low/high levels of abscisic acid in the seeds inhibits/promotes
germination✓✓ (2)
- 6.2 a) The percentage germination of seeds✓ (1)
b) Presence /absence of abscisic acid✓ (1)
- 6.3 - Equal number of seeds used in tray A and B✓
- Same soil used in both trays✓
- - Seeds were exposed to same environmental conditions ✓/
examples of same environmental conditions
- Data collected from both trays at the same time✓
(Mark the first TWO only) (Any 2) (2)
- 6.4 0 ng/g ✓ / anything less than 10 ng/g (1)

ACTIVITY 7

- 7.1 Treatment✓ of plant shoot (1)
- 7.2
- Same type of plant✓
 - Placed in the same environment✓
 - Same amount of time✓
 - Tip removed at the same length✓
 - Same concentration of auxins✓
 - Same type of agar✓
- (Mark first TWO only)** (Any 2) (2)
- 7.3
- (a) - Shoot B would show upward growth✓
- Auxins in the agar gel diffused downwards✓ into the shoot
 - leading to cell elongation✓ (3)
- (b) - No growth in shoot C✓
- Shoot tip contains NO auxins✓ (2)
- 7.4
- Repeat the investigation✓
 - Use more than 1 plant per investigation✓/increase sample size (2)