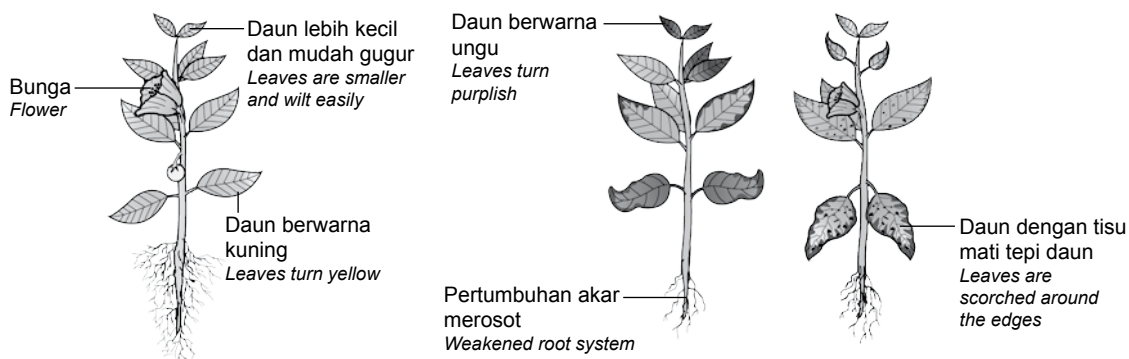




## Tugasan PEKA

2

Kaji situasi di bawah.  
*Study the situation below.*



Liyana telah diberikan tugas oleh gurunya untuk mengkaji kesan kekurangan makronutrien pada tumbuhan. Liyana diberikan tiga keping gambar dan diminta untuk melabelkan kesan kekurangan makronutrien (nitrogen, fosforus dan kalium) dengan tepat.

*Liyana was given the task by her teacher to study the effects of macronutrient deficiency on plants. Liyana was given three pictures and was asked to label the effects of the deficiency of macronutrients (nitrogen, phosphorus and potassium) accurately.*

1. Nyatakan inferens bagi dapatan eksperimen ini.

*State the inference from the findings of the experiment.*

Pertumbuhan tumbuhan menjadi tidak sihat sama ada dari segi saiz tumbuhan, warna daun dan pertumbuhan akar kerana kekurangan makronutrien (nitrogen, fosforus, kalium) merencatkan pertumbuhan tumbuhan.

*Plant growth becomes unhealthy in terms of the size of the plant, colour of leaves and growth of root because the deficiency of macronutrients (nitrogen, phosphorus, potassium) stunts plant growth.*

2. Apakah hubungan antara pemboleh ubah dimanipulasikan dengan pemboleh ubah bergerak balas?

*What is the relationship between the manipulated variable and the responding variable?*

Jika larutan kultur tidak lengkap (tiada nitrogen // kalium // fosforus), maka pertumbuhan tumbuhan akan terbantut.

*If the culture solution is incomplete (no nitrogen // potassium // phosphorus), then plant growth is stunted.*

3. Berikan definisi secara operasi bagi larutan kultur lengkap dalam eksperimen ini.

*Give an operational definition of complete culture solution based on this experiment.*

Larutan kultur lengkap ialah larutan yang menyebabkan saiz tumbuhan normal, warna daun menjadi hijau dan pertumbuhan akar banyak apabila tumbuhan dibekalkan larutan kultur lengkap selama 2 minggu.

*Complete culture solution is the solution that causes the plant size to be normal, the leaves to be green and the root growth to be many when the plant is supplied with complete culture solution for 2 weeks.*

4. Apakah kesimpulan eksperimen ini?

*What is the conclusion of this experiment?*

Kekurangan makronutrien (nitrogen, kalium, fosforus) menyebabkan pertumbuhan tumbuhan terencat.

*The deficiency of macronutrients (nitrogen, potassium, phosphorus) causes plant growth to be stunted.*

5. Apakah kepentingan pengudaraan melalui larutan kultur pada setiap hari?

*Why is it important to aerate the culture solutions every day?*

Pengudaraan melalui larutan kultur membekalkan oksigen bagi respirasi akar anak benih.

*Aerating the culture solution supplies oxygen for respiration by the roots of the seedlings.*

6. Mengapakah larutan kultur di dalam setiap tabung didih ditukar sekali seminggu dengan jenis larutan kultur yang sama?

*Why is the culture solution in each boiling tube replaced every week with the same culture solution?*

Untuk menggantikan makronutrien yang telah diserap oleh anak benih

*To replace the macronutrients that have been absorbed by the seedling*

7. Nyatakan **satu** faktor lain selain nutrien yang mempengaruhi pertumbuhan anak benih.

*State **one** other factor besides nutrients that affect the growth of the seedlings.*

Kehadiran cahaya matahari // kehadiran air

*Presence of sunlight // presence of water*

8. Cadangkan penambahbaikan yang boleh dilakukan bagi memperoleh data yang jitu.

*Suggest a measure you can take to improve the accuracy of the data obtained.*

- Pastikan tabung didih dibalut dengan kertas hitam bagi mengelakkan pertumbuhan alga yang boleh menjejaskan pertumbuhan tumbuhan

*Make sure the boiling tube is wrapped with black paper to prevent the growth of algae that can affect the growth of plants*

- Pastikan jenis anak benih yang sama digunakan bagi setiap kali eksperimen dijalankan

*Make sure the same type of seedling is used for each time the experiment is carried out*

- Pastikan udara dipam masuk

*Make sure the air is pumped in*

9. Adakah dapatan eksperimen yang anda peroleh boleh diterima? Jelaskan jawapan anda.

*Can the findings that you have obtained from the experiment be accepted? Explain your answer.*

Ya. Setelah keputusan eksperimen diperoleh, didapati daun tumbuhan yang direndam di dalam larutan kultur tanpa nitrogen menjadi kuning, pertumbuhan akar tumbuhan yang direndam di dalam larutan kultur tanpa fosforus merosot manakala saiz tumbuhan yang direndam di dalam larutan kultur tanpa kalium terbantut. Maka, hal ini menunjukkan kekurangan makronutrien (nitrogen, kalium dan fosforus) boleh merencatkan pertumbuhan tumbuhan.

*Yes. The results of the experiment show that for the plant immersed in the culture solution without nitrogen, the leaves turn yellow, for the plant immersed in the culture solution without phosphorus, root growth is poor, while for the plant immersed in the culture solution without potassium, plant growth is stunted. Therefore, this shows that deficiencies in macronutrients (nitrogen, potassium and phosphorus) can stunt plant growth.*