

AP Bio

FRQ Fridays

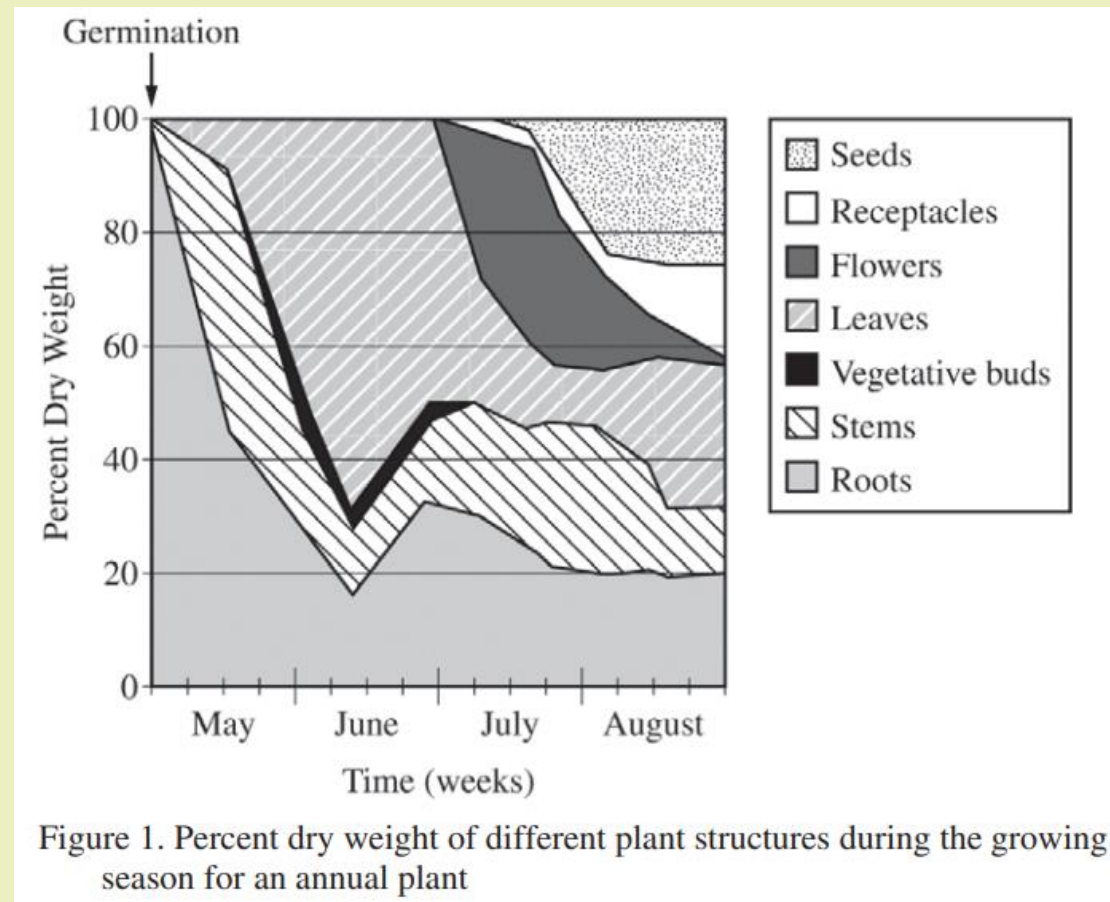
2016 #3
Seeds & Annual Plant Reproduction



FRQ Friday #25

2016 #3

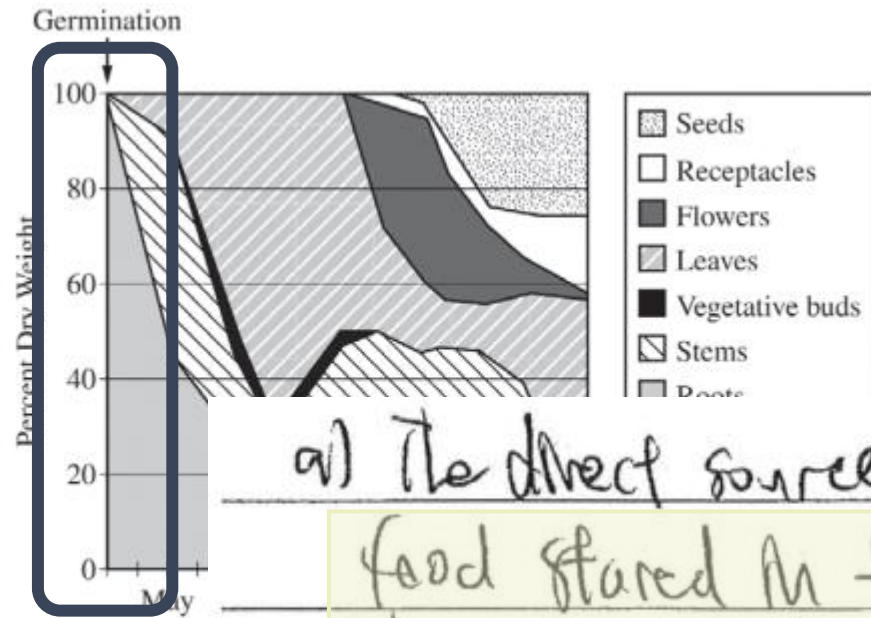
The graph above illustrates the percent dry weight of different parts of a particular annual plant (plants that live less than one year) from early May to late August. The percent dry weight can be used to estimate the amount of energy a plant uses to produce its leaves, vegetative buds, stems, roots, and reproductive parts (seeds, receptacles, and flowers).



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(a) Identify the direct source of the energy used for plant growth during the first week of May, and identify the part of the plant that grew the most during the same period.



Identify direct source of energy (1 point)

- Seed
- Stored organic nutrients/carbohydrates

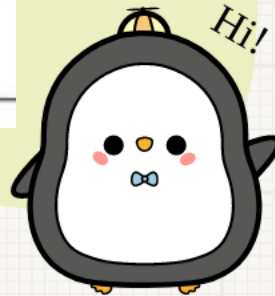
Identify plant part (1 point)

- Roots

a) The direct source of energy for the initial growth is food stored in the seed.

The part of the plant that grew the most during that period are the roots.

Figure 1. Percent dry weight of plant parts over time.



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(b) Based on the data on the graph, estimate the percent of the total energy that the plant has allocated to the growth of leaves on the first day of July.

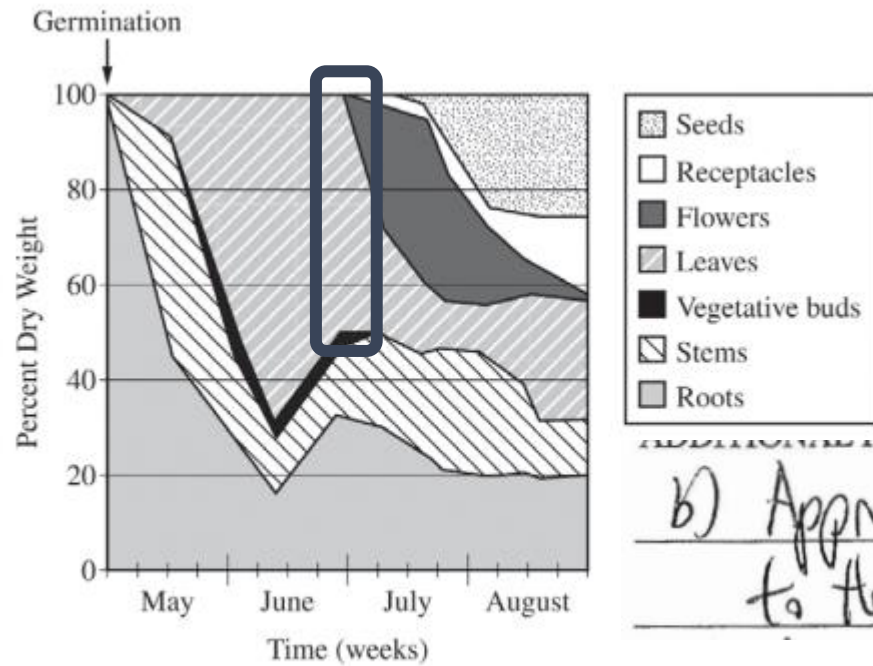


Figure 1. Percent dry weight of different plant structures during the growing season for an annual plant

Identification (1 point)

- Any value between 45-55 percent

b) Approx 50% percent of total energy has been ~~used~~ allocated to the growth of leaves



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(c) Compared with perennials (plants that live more than two years), annual plants often allocate a much greater percentage of their total energy to growth of their reproductive parts in any given year. **Propose ONE** evolutionary advantage of the energy allocation strategy in annual plants compared with that in perennial plants.

Proposed advantage (1 point)

- Increased chance of reproduction before the plants die.
- If the plants do not use the strategy, they decrease the likelihood they will ever reproduce.

c) Annual plants must make reproductive structures in a year or less otherwise they do not get to reproduce. By dedicating more energy to creating reproductive structures annual plants increase their chances of reproducing before death.

