

This is the **Higher Separate** version — includes all Higher Tier content (marked ★) and all Separate Science content.

Selective breeding (artificial selection) is the process by which humans choose which individuals to breed from, to pass on desirable characteristics.

- Process: select individuals with the most desirable characteristics → breed them together → select best offspring → repeat over many generations.
- Examples: high-yield wheat varieties, cows that produce large quantities of milk, dogs bred for temperament and size, fast-growing chicken breeds, disease-resistant crops.
- Advantages: can dramatically improve useful traits quickly; does not require genetic engineering; produces varieties well-suited to human needs.
- Disadvantages: reduces genetic diversity (narrows the gene pool); inbreeding can increase the prevalence of recessive disorders; population more vulnerable to new diseases or environmental changes.
- ★ **HT** The Irish Potato Famine (1845): most Irish potatoes were one variety → when a new blight fungus arrived, almost all potatoes were susceptible → famine.
- ★ **HT** Modern selective breeding is assisted by genetic testing — can select for molecular markers associated with desired traits.

Key Terms

Selective breeding	Choosing individuals with desired characteristics to breed — accelerates evolution of useful traits
Gene pool	The total genetic diversity within a population or species
Inbreeding	Breeding between closely related individuals — increases risk of inheriting two copies of harmful recessive alleles

■ **Exam Tip:** When evaluating selective breeding: advantages (useful traits improved quickly) vs disadvantages (reduced genetic diversity, inbreeding problems, population vulnerability). Always give BOTH sides for evaluation questions.