



DSE 5**

BIOLOGY (E4)

STARSHOOTER

HKDSE Biology Elective 4 - Biotechnology

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1. biotech techniques

1.1 biotechnology	
definition	biological processes, biological systems, organisms to produce goods and services
example	domestication → selectively breed organisms with desirable traits
	<ol style="list-style-type: none"> 1. genetic engineering <ul style="list-style-type: none"> - direct manipulation of genetic material of organism - create GMO genetically modified organism 2. cloning <ul style="list-style-type: none"> - produce genetically identical copies of gene, cells, organisms - product = clones
1.2 Recombinant DNA technology (genetic engineering)	
principle	<ol style="list-style-type: none"> 1. isolation of DNA fragment that contain gene of interest
	<ol style="list-style-type: none"> 2. isolation of vectors <ul style="list-style-type: none"> - vector = DNA molecules that act as carrier → transfer the gene of interest into a host cell → vector replicated in host cells → produce copies of vector together with gene of interest - usually bacterial plasmid & viruses - feature of plasmid: <ul style="list-style-type: none"> - circular double stranded DNA independent of bacterial chromosome - not essential for bacteria to live but can provide survival advantages (e.g. antibiotic resistant) - benefit of using plasmid as vector <ol style="list-style-type: none"> a. replicate independently of bacterial chromosome & have multiple copies in one bacterial cell b. are naturally transferred from one cell to another
	<ol style="list-style-type: none"> 3. restriction - cut DNA fragment and plasmid <ul style="list-style-type: none"> - restriction enzymes <ul style="list-style-type: none"> - recognize specific base sequences (restriction site) + cut at the sites - some enzyme produce blunt end - most of the others produce sticky end → single