Selective breeding and plant propagation

Student activity • observation and reasoning

YEAR 11 / LESSON 95 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

How can desired characteristics be increased, and what are the trade-offs?

Use the supplied examples, record your reasoning and correct it using evidence.

Equipment

- Student booklet, pencil and ruler
- Selective-breeding and micropropagation process cards

Paper, modelling and written reasoning only. No chemicals or biological samples are handled.

Course coverage: Shared Biology / Double Award: 5.10–5.11. Biology-only extension: 5.17B–5.18B micropropagation.

Plan, model or apparatus sketch

Draw and label the apparatus or biological model; identify one limitation.

Method and reasoning

Read the whole sequence before starting

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1. Choose a fictional crop trait and explain how breeders select parents, cross them, assess offspring and repeat selection over generations.

2. Apply the same logic to an animal trait while considering health and welfare rather than yield alone.

3. Explain that breeding selects inherited variation; it does not make organisms acquire a needed mutation deliberately.

4. Evaluate reduced genetic diversity and linked unwanted traits as possible consequences.

5. Biology extension: sequence explant selection, sterile culture on suitable nutrient/hormone medium, shoot/root development and acclimatisation.

6. Biology extension: compare rapid clone production with contamination, cost and shared susceptibility risks.

Cleanup

- Return models and keep the corrected work.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Selective breeding changes the frequency of desired inherited traits through chosen reproduction. Micropropagation is a Biology-only cloning extension, not the same process as selective breeding. This lesson uses paper process cards; it does not provide an unvalidated tissue-culture recipe.

Example / trial	Observation / evidence	Explanation / limit
Evidence / comparison		
Explanation		
Limit / correction		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. What is selected in breeding?

2. Why repeat across generations?

3. Name one potential disadvantage.

4. Biology: what is an explant?

5. Biology: why use aseptic culture?

6. Biology: why can a uniform clone crop share vulnerability?