Recombinant DNA and vectors

Teacher / technician

YEAR 11 / LESSON 99 / BIOLOGY + SCIENCE (DOUBLE AWARD)

Staff preparation and answer guidance. Keep separate from student sheets. Original learning tasks; no supplied numerical example represents class measurements.

Coverage and delivery

Shared Biology / Double Award: 5.12–5.13. Restriction enzymes, ligase and vectors.

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, working in 15 pairs

Item	Per pair / setup	Class total
Student booklets	1 per learner	30
Pre-cut paper DNA strips, plasmid loop and joining tape	1 set per pair	15 sets
Rulers	1 per pair	15

Immediate safety

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

Preparation and delivery

Read alongside the student method

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1. Provide 30 booklets, 15 rulers and 15 sets of pre-cut paper DNA strips, plasmid loop and joining tape.

2. Keep answers separate until learners have attempted the tasks; discuss the reasons for corrections.

3. Mark matching recognition sites on the gene strip and plasmid loop; prepare compatible stepped ends in advance. Pupils separate and tape the paper model without blades. Label the tape as a model of ligase joining the backbone.

Close of lesson

- Return models and keep the corrected work.

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

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- A specific DNA sequence.
- Joins DNA fragments by forming backbone bonds.
- A small DNA molecule separate from a cell’s main chromosome in the standard bacterial model.
- Carrying genetic material into a recipient.
- No.
- No; expression and product checks are required.

References and provenance

Pearson Biology specification

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.