Plant responses to light and gravity

Student activity • observation and reasoning

YEAR 10 / LESSON 44 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

How can a plant grow in relation to a directional stimulus?

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

Equipment

- Booklet, pencil and ruler
- Teacher-selected, time-labelled seedling photograph sets showing the initial and final states for matched light and gravity comparisons

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

Course coverage: Shared Biology / Double Award: 2.83–2.84. Plant responses.

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. Use labelled photographs of matched seedlings grown with light from one side and with even overhead light. State when each image was taken.

2. Mark the shoot's initial and final direction; distinguish growth curvature from an immediate movement.

3. Compare shoot response with roots from a separate gravity investigation kept in darkness.

4. Define positive and negative tropisms with reference to the stimulus direction.

5. Plan matched seedlings, water, temperature, starting orientation and light conditions for a multi-day investigation.

6. Explain why directional light and gravity must not be changed together if you want to isolate either stimulus.

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

Shoots commonly show positive phototropism and negative gravitropism; roots commonly show positive gravitropism. These are growth responses. Use real time-labelled observations or clearly labelled schematic examples, never fabricated experimental results.

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. Define tropism.

2. What is positive phototropism?

3. What is negative gravitropism?

4. What is a common root response to gravity?

5. Why use several seedlings?

6. Why is a single end photograph limited?