Environmental factors and transpiration

Student activity • observation and reasoning

YEAR 10 / LESSON 41 / BIOLOGY ONLY

The question

How do environmental conditions affect water loss from leaves?

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

Equipment

- Student booklet, paper models, pencil and ruler

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

Course coverage: Biology only: 2.57B. Transpiration factors.

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. Draw the pathway from moist mesophyll surfaces through air spaces and stomata to the surrounding air.

2. Predict the effects of changing air movement, humidity, temperature and light separately. Explain each prediction.

3. Distinguish evaporation within a leaf from diffusion of water vapour out of the leaf.

4. Explain how wind can remove the humid boundary layer and how high external humidity reduces the vapour gradient.

5. Discuss why light often increases stomatal opening, while water stress can cause closure and change the expected trend.

6. Plan a comparison that changes one factor and measures water uptake; identify why uptake is only a proxy for transpiration.

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

Predictions assume comparable plants and other conditions controlled. Temperature can affect evaporation and the vapour gradient. Stomatal responses and water availability can modify patterns. Relative humidity is expressed as a percentage; 100% means saturation at that temperature.

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 evaporates inside the leaf?

2. How can wind increase loss?

3. Why can high humidity reduce loss?

4. How does light often act?

5. Why might a hot dry plant lose less water than predicted?

6. Does bubble movement directly measure evaporation?