

Nova's Autumnal Investigation: The Science of Change

Learning objective: To understand the life cycles of deciduous plants and the environmental factors that trigger changes in the autumn season.

Nova the owl has been observing the forest as the days grow shorter. Use your scientific knowledge to complete the 'True or False' challenge. For every statement, you must provide a brief scientific justification for your answer to demonstrate your understanding of seasonal biological patterns.

Word bank: chlorophyll · deciduous · photosynthesis · dormancy · daylight · temperature · pigment

1. True or False: Leaves change colour in autumn because the tree is preparing to start photosynthesis again. Justify your reasoning. (2 marks)

2. True or False: Deciduous trees shed their leaves to conserve water and energy during the colder winter months. Explain the advantage of this behaviour. (2 marks)

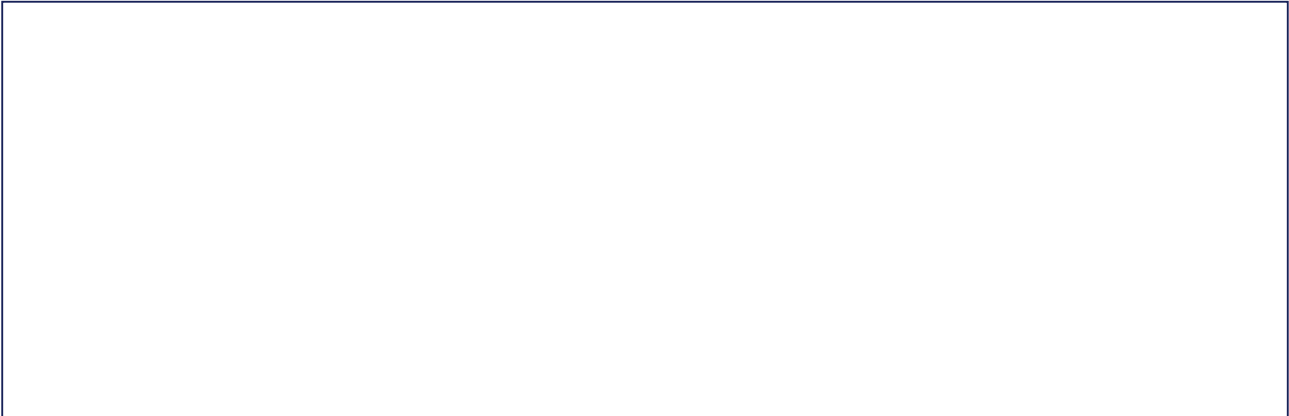
3. True or False: The reduction in hours of daylight is the primary environmental trigger that tells a tree it is time to prepare for winter. What might happen if a tree did not respond to these light cues? (2 marks)

4. Compare and contrast the role of chlorophyll in summer versus the role of other pigments (like carotenoids) in autumn. (2 marks)

5. Justify why a tree that keeps its leaves all year round (an evergreen) might struggle in a climate with very heavy snowfall compared to a deciduous tree. (2 marks)

6. Explain why trees store nutrients in their roots and trunks before the leaves drop. How does this support the tree's survival? (2 marks)

Draw: Draw a cross-section of a tree branch in late autumn. Label the abscission layer where the leaf meets the twig and show where the tree is sealing off the connection to protect itself.



Extension challenge: Nova wants to conduct an experiment to see if all trees change colour at the same time. Design a method for a 4-week field study in your local park. Include your hypothesis, a list of variables you will keep constant, and a table template for recording the percentage of colour change on three different tree species.