

Demonstrate understanding of the responses of plants and animals to their external environment

Level 3 5 Credits External

This achievement standard involves demonstrating understanding of the responses of plants and animals to their external environment.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of the responses of plants and animals to their external environment.	Demonstrate in-depth understanding of the responses of plants and animals to their external environment.	Demonstrate comprehensive understanding of the responses of plants and animals to their external environment.

- ☐ Describing plant and animal responses to their external environment.
 - the process(es) within each response
 - how the responses occur
 - the adaptive advantage provided for the organism in relation to its ecological niche.
 - why the responses provide an adaptive advantage for the organism in relation to its ecological niche.

- ☐ *Responses* are selected from those relating to:
 - orientation in space
 - tropisms,
 - nastic responses,
 - taxes,
 - kineses,
 - homing,
 - migration
 - orientation in time
 - annual,
 - daily,
 - lunar,
 - tidal rhythms
 - interspecific relationships
 - competition for resources,
 - mutualism,
 - exploitation including herbivory, predation, and parasitism
 - intraspecific relationships
 - competition for resources,
 - territoriality,
 - hierarchical behaviour,
 - cooperative interactions,
 - reproductive behaviours

- ☐ *External environment* will include both biotic and abiotic factors.

Learning Outcomes:

At the end of this topic I can –

- Describe the **environment** in terms of **biotic** and **abiotic** factors.
- Distinguish between a **tropism** and a **nastic** response.
- Explain the **adaptive value** of **tropisms** and **nastic** responses.
- Explain the role of **plant hormones** in controlling plant responses to environmental factors.
- Interpret **historical experiments** relating to **phototropism**.
- Describe the effect of **specific plant hormones** on plant **growth** and development.
- Distinguish between **learned** and **innate behaviour**.
- Distinguish between a **taxis** and a **kinesis**.
- Describe the **adaptive value** of **taxes** and **kineses**.
- Distinguish between **migration** and **homing**.
- Identify the environmental cues involved in triggering migration and homing.
- Describe how animals navigate during migration and homing.
- Explain the adaptive value of migratory behaviour and homing.
- Describe how the **astronomical cycle** creates environmental **cues**.
- Describe the function of a **biological clock**.
- Use **examples** to distinguish between the differing **biological rhythms**.
- Explain the two parts of the mechanism underlying biological rhythms.
 - The **endogenous** part.
 - The **exogenous** part.
- Interpret activity diagrams of organisms, using the following terms: **free running period**, **phase shift**, **entrainment**, **zeitgeber**.
- Explain the **adaptive value** of **biological timing**.
- Define **photoperiodism**.
- Distinguish between **short** and **long day plants**.
- Explain the role of **phytochrome** in **photoperiodism**.
- Explain the adaptive value of **vernalisation**, **dormancy** and **abscission**.
- Explain the importance of **ritual** in preventing fighting.
- Distinguish between **territory** and **home range**.
- Discuss the **adaptive** value of **territoriality**.
- Define **hierarchy**.
- Describe how **rank** is communicated.
- Describe the significance of social **dominance**.
- Use field data to determine a **linear hierarchy**.
- Discuss mechanisms by which plants and animals **reduce intraspecific competition**.
- Define **co-operative** behaviour.
- Describe survival value of **group co-operative behaviour**.
- Describe the role of **courtship** behaviours in breeding.
- Explain the adaptive advantage of the **pair bond**.
- Explain the variability in the degree of **parental care** in different species.
- Explain how having a **specific niche** reduces **interspecific competition**.
- Using a **predation/prey** graph describe the relationship between predator and prey.
- Describe **techniques** of **predation**.
- Describe **strategies** used by prey to **avoid predators**.
- Describe plant physical and chemical defences against herbivores.
- Define the terms **mutualism**, **commensalism**, **exploitation** including herbivory, predation and parasitism using examples to illustrate definition.