

## AS91603

### 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.