**EDF4402: Assignment Task 1A: CoRe**

***Unit 2 – Organisms and their environment***

***Area of Study 1 – Adaptations of Organisms***

***Big Idea: Behavioural Adaptations (Individual and group behaviours of animals including rhythmic activities, feeding behaviours; communication; social and territorial behaviours).***

**Assessment Task 1 - Developing a Teaching and Learning Resource**

**Part A: Big Ideas in Biology starting with a CoRe (Individual task)**

**VCE YEAR LEVEL 11. BIG IDEA: Behavioural Adaptations**

|  |  |  |
| --- | --- | --- |
| **What you Intend the students to learn about this idea.** | * Behaviours are integrated patterns of activity. They serve essentially two purposes: enable environmental interaction, and to meet the physiological demands within them. * The nervous and hormonal systems of an organism are the physiological basis of behaviour. * Most animal behaviour is a sequence of responses related to: obtaining food; acquiring and maintaining living space; protection and reproduction. * Rhythmic behaviours: Organisms have adapted control mechanisms that regulate behaviour and synchronize them with cyclic changes in the external environment. * Instinctive behavioural adaptations (closed instincts): * *Innate releasing mechanisms (fixed action patters).* * Programmed learning behavioural adaptations (open instincts): * *Habituation.* * *Imprinting.* * Feeding behavioural adaptations: Foraging strategies * *Food selection (net energy intake).* * *Diurnal.* * *Nocturnal.* * *Crepuscular.* * Defence / Aggression: * *Competition.* * *Predator.* * *Territorial.* * *Sexual partners.* * Communication (Visual; auditory; touch): * *Warning/alarm gestures.* * *Mating gestures.* * Sociality: * *Hierarchical gestures.* * *Specific group behaviours (foraging; protection; reproduction).* * Territorial: acquisition and retention * *Gestures of aggression / antagonistic behaviour.* * *Gestures indicating size.* * *Gestures indicating defence* * Reproduction: natural and sexual selection (communication). * *Evolved for the promotion of sexual reproduction.* * *Differentiate strategies between solitary and group living organisms.* * *Behavioural evolution through competition (who communicates most* effectively?). * *Describe examples of mating gestures.* * Altruism (selective advantages?): The case for and against. * Individual and group behaviours of animals (advantages & disadvantages)   Rhythmic activities:   * Circadian rhythms. * *Hibernation.* * *Migration.* * *Flocking.* * *Leking.* |  |
| **Why is it important for students to know this.** | * Develop an understanding of essential biological principles based upon knowledge of living organisms. One component to this is behavioural adaptations. This component is significant when married with other aspects of biological evolution to reach comprehensive understanding of the complete repo tour of adaptations living organisms use to successfully survive and reproduce. |  |
| **What else you know about this idea (that you do not intend the students to know yet).** | * That there are differences in the effectiveness in the way individuals employ behavioural adaptations, and that these differences affect individual survivourship. * Effective employment of behavioural adaptations influence beyond the individual scale to speciation and in turn whole ecologies via both natural and sexual selection. * That organisms are limited in their distribution between environments by a number of factors including behavioural adaptations. * That successful integration of group living organisms (especially higher order species) depends on a number of factors including behavioural adaptations. |  |
| **Knowledge about students’ thinking/difficulties connected with teaching this idea:** | * Students should have had some exposure to these ideas from science in years 7 to 10. * Distinguishing between innate and learned behaviours. * Distinguishing between behavioural; structural and physiological adaptations. |  |
|  |  |  |
|  |  |  |
| **Teaching procedures (and particular reasons for using these to engage with this idea).** | 1. Explain the concept of Venn diagrams and their uses.   ***Rational:*** *These* *Venn diagrams* *are designed to facilitate learning through the technique of scaffolding.*   1. Ask students to form groups. Each group draws and evaluates three comparative Venn diagrams (bahavioural; structural & physiological adaptations). The exercise is designed both to contrast and compare types of adaptations. Groups swap diagrams and add suggestions. Groups reform to refine their Venn diagrams given the additional information.   ***Rational:*** *The task distinguishes adaptations and cements the idea that each are beneficially linked. Task installs a valuable method of diagrammatical representation.*   1. Students draw concept maps for ‘behavioural’ adaptations of individual and group living animals using the four sub-headings: Rhythmic Activities; Feeding Behaviours; Communication, and Social and Territorial Behaviours.   ***Rational:*** *Students gain confidence in using different expressions of learning i.e. the knowledge gained via the use of concept maps and Venn diagrams. Extrapolating on that confidence is hoped to better enable students to address the following class-based task. I’m aiming to teach both subject matter as well as an effective methods of learning.*   1. Isolate broad sub-topics: ‘food resources, territoriality, protection and reproduction’. Discuss each using classical examples of squirrel, bull, spur-winged plover and bird of paradise respectively (information work sheets provided on each). Make note of how each behavioural adaptation operates in unison with other types of adaptations to maximize the survivourship of the individual.   ***Rational:*** *Constructivist learning technique continuing; theory based on known examples helps to give authentic meaning to the subject matter. Specific examples used from which further refinement of an isolated example will follow in a field based task. Evidence of learning is able to be expressed through a different form (written). This provides opportunities for individual expression of knowledge, and aids teacher understanding of how individual best convey learning.*   1. Field Trip: 2. Visit Tasmanian Natural History Museum. Given background information, for each of the stuffed animals make a list of their likely behavioural adaptations. Look closely at their body form and niche they fill.   ***Rational:*** *Tangible examples realized to fortify theoretical learning. Opportunity to compare and contrast a range of behavioural adaptations through a range of species in a ‘single sitting’. Good pre-curser to the specific ‘real’ example of behavioural adaptations addressed in Field Trip part b.*   1. Journey to an agricultural area to witness behavioural adaptations of a common Tasmanian endemic – Tasmanian native hen. Behaviours likely viewed include; group defence of territories holding both food resources and potential mates (vocalizations and fighting – variations of each can be easily distinguished).   ***Rational:*** *A commonly seen species is brought into sharper focus: This allows memory to recapitulate knowledge gained, on a regular basis – repetition of this field trip is more likely ‘re-lived’ when constantly reminded.*   1. Summary:   Students are asked to collate information gathered from the course of lessons to form their own description of behavioural adaptations for a chosen species (favorite) to present to the class in a brief 2 min seminar. Computer room made available to resource information.  ***Rational:*** *Allows students to contemplate and strategically display what they have discovered. It also allows another avenue to display learning. This allows ownership and responsibility for individual effort borne from collaborative discussions and group activities. Those that do not present well are marked on their best contribution of the above tasks set for this series of lessons to remove bias in the assessment process.* |  |
| **Specific ways of ascertaining students’ understanding or confusion around this idea (include likely range of responses).** | * Reviewing Vemn diagrams /concept maps submitted. * Understanding that students express learning in different ways: assessing each opportunity to express learning individually. * Appropriating techniques to best suit students who do not express learning (devise alternative techniques to assess learning). * Likely confusion may be in distinguishing between structural and behavioual adaptations e.g. Frilled-necked lizard uses structural (frill), and behavioural (expansion of frill) adaptations in near interpolation. * Innate and learned behaviours may not to distinguished e.g. a dog is innately social in behaviour, but also responds to circumstance. |  |

**References:**

Berne, R.M., & Levy, M.N. Physiology (3rd Ed.). A Mosby imprint of Mosby – Year Book, Inc. U.S.A.

Campbell, N.A. (1990). Biology (2nd Ed.). The Benjamin/Cummings Publishing Company, Inc. U.S.A.

Dorit, L. R., Walker,W.F., & Barnes, R.D. (1991). Zoology. Saunders College Publishing, U.S.A.

Loughran, J., Berry, A & Mulhall, P. (2006).*Understanding and Developing Science Teachers’ Pedagogical Content Knowledge.* Sense Publishers, The Netherlands.

Sargeant, J. (2006). Developing a Pathway for Authentic Learning and Assessment. *Journal for the School Professional, 2*(10), 4-6.

Victorian Curriculum Assessment Authority (2010). VCE Biology Study design. Viewed 28 July 2010, <http://vels.vcaa.vic.edu.au/>