

## Teacher Sheet for Lab. on Mealworms

This investigation is intended to be a **Type II investigation** for TAS as guidance is given on the planning of the method, recording of results and evaluation of conclusions.

### II. Specific Guidelines

The pupils can study the mealworms' responses to a number of external stimuli such as light, moisture, oxygen concentration, temperature, acid and food. Dependent on the conditions under study, the independent variables can be *light and dark conditions, moist and dry conditions, differential air concentration* etc. The dependent variable is the distribution of the mealworms in different conditions. For each stimulus under study, 2-3 measurements will be made, each time using a different set of mealworms.

### II. Suggested Answers for Questions on Pupils' Lab Sheet

A1: I want to find out the responses of mealworms to the following conditions: *light, moisture, and oxygen concentration*. Other conditions include: temperature, acid, food etc.

B1: The independent variables are: light and dark conditions, moist and dry condition, differential air concentration.

B2: The dependent variable is the distribution of the mealworms in different conditions. For each stimulus under study, 2-3 measurements will be made, each time using a different set of mealworms.

B3: The sample of mealworms in each set-up shows normal behaviour. The normal behaviour of the mealworms will not be affected by the treatment.

B4: In each set-up, only the stimulus under study is varied. All other conditions should be kept uniform.

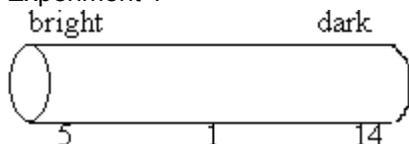
B5: See Appendix 1.

B6:

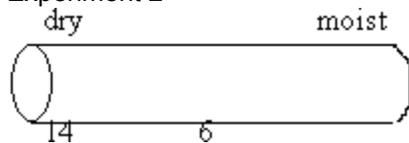
Stimulus under study	Distribution of mealworms (no.)			
	low	increasing intensity of stimulus		high
1. light				
2. moisture				
3. oxygen concentration				

### D1: Specimen results

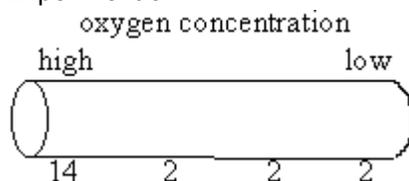
Experiment 1



Experiment 2



Experiment 3



D2: A bar chart.

E1: The mealworms prefer a dark and dry environment with abundant air supply.

E2: Accept any reasonable and original designs based on the pupils' results..

E3: The mealworms may not behave in the normal way. Try to treat the mealworms as gentle as possible, e.g. transfer the mealworms with a camel hair brush.

E4: Other interesting investigations with the mealworms:

- *To find out the responses of mealworms to other stimuli such as food substances, acids and temperature.*
- *To study the effect of temperature on the respiration rate of mealworms*
- *To study the growth and development of mealworms*

Observe and record the growth of mealworms. Plotting a growth curve of length (or weight?) of the animal against time. Make drawings of different stages of development of the mealworm, i.e. the larval stage, the pupa stage and the imago stage.