**Investigation into the effect of an environmental variable on the movement of an animal using either a choice chamber or a maze**

Using choice chambers to investigate responses in invertebrates to light/dark and humid/dry conditions

**Learning objectives**

* To develop practical skills h
* Demonstrate competencies 2a; 2b; 2c; 2d; 3a; and 4a.
* To demonstrate a kinesis response in woodlice by changing light and humidity.
* To use the chi square test to test the probability of the results being due to chance alone

**Method**

You are provided with the following:

* a choice chamber with nylon mesh fabric
* silica gel
* humidity test strips (cobalt chloride strips which have been dried – blue when dry and pink when moist)
* paper towels
* water
* black paper
* Sellotape
* maggots (or woodlice)
* beaker
* teaspoon
* forceps.

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**Control experiment**

1. Set up the choice chamber with nothing in the base quarters.
2. Place 12 maggots in the chamber through the central hole, using the teaspoon.
3. Wait 4 minutes then record the number of maggots in the left and right halves of the choice chamber. Record your results.

If the left and right halves have no effect on the distribution of the maggots the expected results would be six in each half, but this will not always occur because of chance distribution. If your results are not 6 in each half do a statistical test on your results to discover the probability of them occurring by chance. If this test shows a greater than 5% probability of the results occurring by chance then you can proceed with the experiment.

**The effect of light**

1. Cover half the choice chamber with black paper to make it dark.
2. Place 12 maggots in the chamber through the central hole, using the teaspoon.
3. Wait 4 minutes and then record the number of maggots in the dark and the light halves.

If light has no effect on the distribution of maggots the expected results would be six in each half. Now do a statistical test on your results to find the probability of them occurring by chance.

**The effect of humidity**

1. Place damp paper towel in one half of the choice chamber and silica gel in the other. Use the humidity test strips to ensure that a humidity gradient exists in the chamber before adding the maggots. Use the forceps to place the humidity test strip.
2. Place 12 maggots in the chamber through the central hole.
3. Wait 4 minutes and then record the number of maggots in the humid and the dry halves.

**The effect of light and humidity**

In reality living organisms do not have simple choices between one pair of contrasting environmental factors. If you have time do a final experiment with the choice between dark and dry, dark and humid, light and dry, light and humid. Again test the probability of your results occurring by chance with a statistical test.

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|  | Apparatus and techniques |
| AT h | safely and ethically use organisms to measure:* plant or animal responses
* physiological functions
 |
| 2. Applies investigative approaches and methods when using instruments and equipment | a. Correctly uses appropriate instrumentation, apparatus and materials (including ICT) to carry out investigative activities, experimental techniques and procedures with minimal assistance or prompting. b. Carries out techniques or procedures methodically, in sequence and in combination, identifying practical issues and making adjustments when necessary. c. Identifies and controls significant quantitative variables where applicable, and plans approaches to take account of variables that cannot readily be controlled. d. Selects appropriate equipment and measurement strategies in order to ensure suitably accurate results.  |
| 3. Safely uses a range of practical equipment and materials | a. Identifies hazards and assesses risks associated with these hazards, making safety adjustments as necessary, when carrying out experimental techniques and procedures in the lab or field.  |
| 4. Makes and records observations | a. Makes accurate observations relevant to the experimental or investigative procedure.  |