Learning performance of humans (Item No.: P4080300)

Curricular Relevance

| Area of Expertise: Biology | Education Level: Age 16-19 | Topic: Behaviour | Subtopic: Innate behaviour (reflex, instinct) and learned behaviour (experience, conditioning) | Experiment: Learning performance of humans |
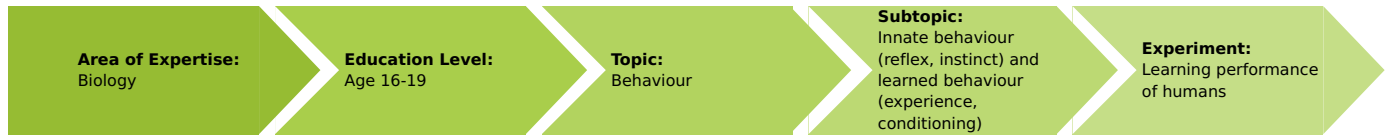
Difficulty	**Preparation Time**	**Execution Time**	**Recommended Group Size**
Easy	10 Minutes	30 Minutes	2 Students

Additional Requirements:	**Experiment Variations:**

Keywords:

Finger labyrinth, Learning behaviour, Learning curve, Short-term memory, Medium-term memory

Overview

Principle

The blindfolded test subject has to find the way to the finish with a felt-tip pen in the slits of a finger labyrinth. Success and error are checked by placing a sheet of paper underneath. The learning curves for two different test objectives are drawn: to cross the maze with the least number of errors and as quickly as possible.
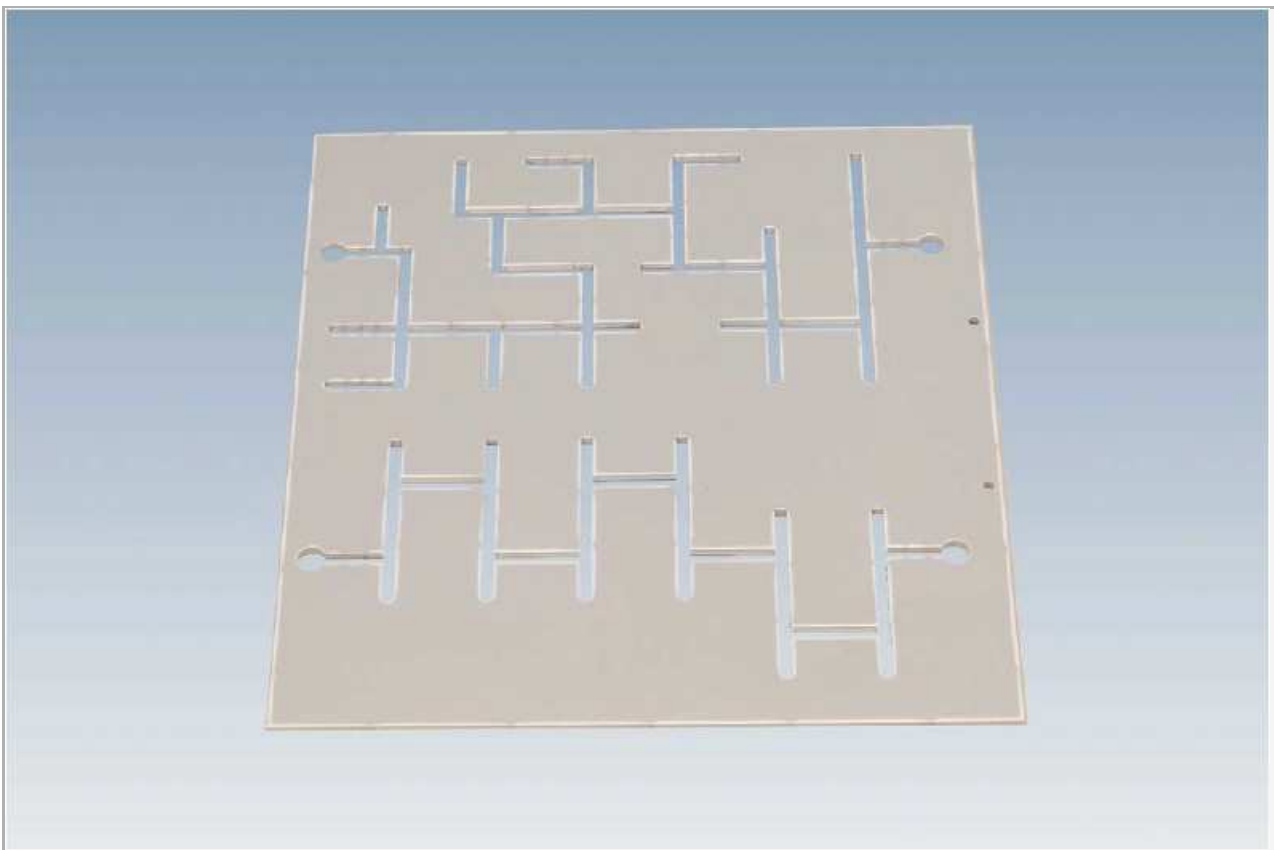

Fig. 1: Experimental set-up

Equipment

Position No.	Material	Order No.	Quantity
1	Finger labyrinth	65990-00	1
2	Stop watch, interruption type	03076-01	1

Tasks

The blindfolded test subject has to find the way to the finish with a felt-tip pen in the slits of a finger labyrinth. Success and error are checked by placing a sheet of paper underneath. The learning curves for two different test objectives are drawn: to cross the maze with the least number of errors and as quickly as possible.

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Set-up and procedure

- The finger labyrinth must be kept hidden until the test subject's eyes have been covered with a blindfold or glasses with opaque lenses.

- The labyrinth plate is then placed on the table in front of the test subject so that the simplest labyrinth is at the bottom (Fig. 1). A sheet of writing or typing paper is pushed under the plate. To assist with orientation, the test subject may be allowed to touch the sides of the labyrinth plate (not the labyrinth itself).

- The test subject's hand holding the felt-tip pen, is then led to the starting hole by the experimenter. The subject must now find the way with the pen through the slits to the finish without touching the labyrinth plate with his hand.

- In the first part of the experiment the subject is to attempt to make as few errors as possible (i.e. travelling down dead ends); the time taken to reach the end is initially of no importance.

- If the test subject has reached the end, he is advised accordingly. The colour of the pen is changed, the paper underneath displaced slightly and the subject's hand taken back to the starting point.

- The procedure is repeated until the subject crosses the labyrinth without error on a number of consecutive attempts.

- The paper under the labyrinth is changed after approximately 5 crossings. The individual attempts are numbered for later evaluation.

- In the second part of the experiment the test subject is to attempt to cross the labyrinth in the shortest possible time, while errors are disregarded. As the subject is already familiar with the labyrinth, the labyrinth plate is reversed so that the finish now becomes the start. The conditions of the experiment, apart from timing, are the same as for the first part. Crossings are repeated until the time taken to cross cannot be further reduced.

- For purposes of comparison the two parts of the experiment are also carried out using different subjects (who must never have seen the labyrinth). The second, more difficult labyrinth on the plate should also be tested in the same way.

- If sufficient time is available some experiments can be carried out with the reversed labyrinth under otherwise identical conditions and with the same test subject.

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Result and evaluation

Results and evaluation

- If a person has to find his way through a labyrinth, he will first of all attempt to obtain an overall view of the labyrinth. If, however, an overview of the labyrinth is prohibited, the test subject is obliged to find his way by trial and error. In the first attempt incorrect paths are frequently selected and the time taken to cross is relatively long. In subsequent practice crossings the number of errors as well as the time required are reduced steadily, until the values settle at a particular level.

- To construct a learning curve a graph is prepared for each test condition. The number of crossings is entered on the abscissa and the number of errors per crossing on the ordinate axis, or the time taken per crossing in seconds. If several test subjects are tested under the same conditions the results should be entered on the same graph. The test results are joined by lines.

- The learning curves generally show a steep fall during the first crossings. For the simple labyrinth the number of errors after approximately 10 crossings is 0, and the minimum crossing time is achieved after 15 to 20 crossings. In the error curve the learning phase is therefore completed at an earlier stage and the success phase begins earlier than in the time curve. After freedom from error is achieved some further improvement can be made in crossing speed. Almost all test subjects show "relapses" in the learning phase: the results of the 3rd to 5th attempts are worse than those of the first attempts. This phenomenon can be explained by reduced concentration, the transition from short-term memory to medium-term memory or by factors which are so far unknown.

- For the more difficult labyrinth the learning phase is naturally longer (at least 20 crossings on the error curve): the learning curve falls less steeply. The mirror image labyrinth is more quickly learned than the original labyrinth. This is certainly not only attributable to the ability to produce a mirror reversal in the brain of what has been learned. The test subject has more difficulty with the first attempt at crossing a labyrinth than with the second attempt -he has to "learn how to learn a labyrinth".