Science Questions:

Millennium Bugs

The ability to learn numbers requires an understanding of symbolic representation. It has been thought that to do *math-like thinking*, you need a human brain and an advanced culture.

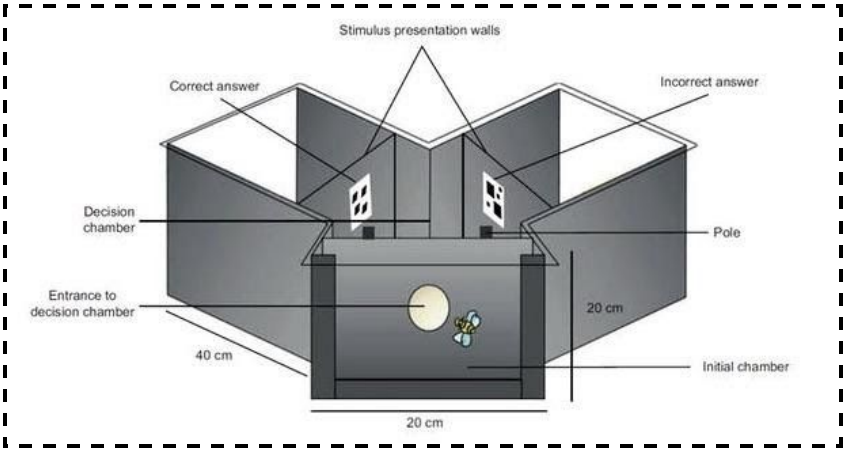
Scientists have been studying honeybees and their abilities. In one such experiment, two groups of bees- A and B were taken. They were presented with a *task* where different numbers of shapes were presented to them. They were required to select a group of four shapes for the successful completion of the task in contrast to higher number (upto ten) of shapes that signified a failure in the task. Hence, they were presented with a choice of two different patterns, each containing a different number of shapes, as opposed to other numbers up to ten.

Different training strategies were used for Group A and B

Group A- Comprising 10 bees- They were given a reward for a correct choice, and nothing for an incorrect choice

Group B- Comprising 12 bees- They received a sugary reward for picking four, or bitter quinine if they made a mistake

Each experiment conducted with a single bee lasted about four hours, by which time each bee had made 50 choices.



The group that only received sweet rewards could not successfully learn to discriminate between four and higher numbers. But the second group reliably discriminated the group of four items from other groups containing higher numbers.

Question 1:

Which of the following conclusion(s) are correct?

A. The bees' ability to learn higher number discrimination depends only on their innate abilities
B. The bees' ability to learn higher number discrimination depends on their innate abilities as well as on the appropriate method of training exposure given to them.
C. Risks as well as Rewards on offer helped the bees to learn to discriminate between lesser and higher numbers.
D. The bees are able to use this learnt *math-like* thinking when they collect nectar from flowers.

Science Questions:

Question 2:

What were the probable hypothesis/ hypotheses of this study?

Question 3:

For Group B bees, where would the nectar and quinine be placed?

Electroplating

The process of depositing a layer of any desired metal on another material by means of electricity is called **electroplating**. It is widely used in industry for coating metal objects with a thin layer of a different metal. The layer of metal deposited has some desired property, which the metal of the object lacks. For example, chromium plating is done on many objects such as car parts, bath taps, etc. because it has a shiny appearance and does not corrode.

Question 4: Shambavi wanted to coat a brass key with copper and decided to set up an experiment. She took the brass key as one electrode and a copper plate as the other electrode. What should be the electrolyte for this experiment to work? Give reasons.

Question 5: The time taken for the brass key to be completely electroplated would depend on which factor(s)?