

Thème 1 – La Terre dans l'Univers, la vie, l'évolution du vivant

1-A – Génétique et évolution

Culture seen in bumblebees

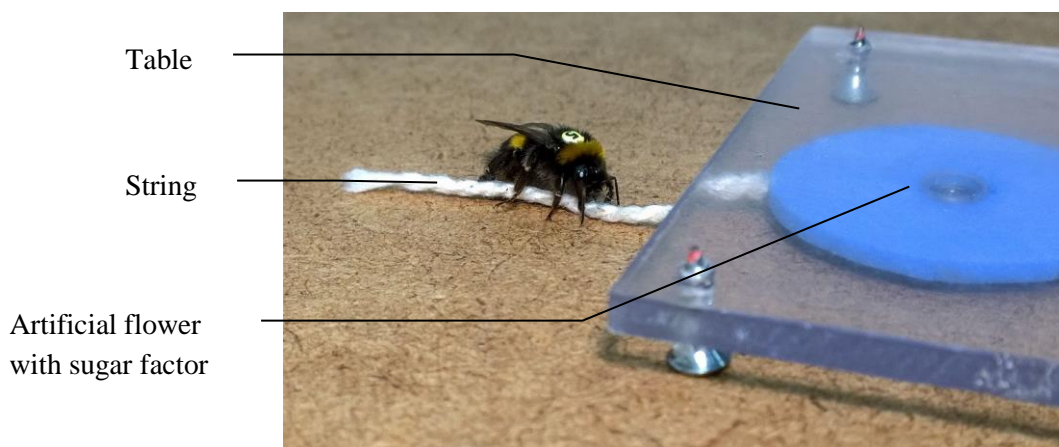
Using the documents, explain how surprising this example of a cultural transmission is.

Document 1: Hints of culture seen in bumblebees

By Elizabeth Pennisi, Oct. 6, 2016.

<http://www.sciencemag.org>, the website of SCIENCE Magazine.

- 5 For years, cognitive scientist Lars Chittka felt a bit eclipsed by his colleagues at Queen Mary University of London. Their studies of apes, crows, and parrots constantly revealed how smart these animals were. He worked on bees, and at the time, almost everyone assumed that the insects acted on instinct, not intelligence. "So there was a challenge for me: could we get our small-brained bees to solve tasks that would impress a bird cognition researcher?" he recalls. Now, it seems he has succeeded at last.
- 10 Chittka's team has shown that bumblebees can not only learn to pull a string to retrieve a reward, they can also learn this trick from other bees, even though they have no experience with such a task in nature. Many researchers have used string pulling to assess the intelligence of animals, particularly birds and apes. So Chittka and his colleagues set up a low clear plastic table barely tall enough to lay three flat artificial blue flowers underneath. Each flower contained a well of sugar water in the center and had a string attached that extended beyond the table's boundaries. The only way the bumblebee could get the
- 15 sugar water was to pull the flower out from under the table by tugging on the string. The team put 110 bumble bees, one at a time, next to the table to see what they would do. Some tugged at the strings and gave up, but two actually kept at it until they retrieved the sugar water. In another series of experiments, the researchers trained the bees by first placing the flower next to the bee and then moving it ever farther under the table. More than half of the 40 bees tested learned what to do.
- 20 Next, the researchers placed untrained bees behind a clear plastic wall so they could see the other bees retrieving the sugar water. More than 60% of the insects that watched knew to pull the string when it was their turn. In another experiment, scientists put trained bees back into their colony and a majority of the colony's bees picked up string pulling by watching one trained bee do it when it left the colony in search of food. Even after the trained bee died, string pulling continued to spread among the colony's younger workers.
- 25 The fact that bumblebees could learn to do so shows their unexpected behavioral flexibility. The findings could hint at a rudimentary form of culture in bees. With their ability to learn where others are, find out what they are doing, and experimenting on their own, the insects demonstrated that they can pass on knowledge—a key requirement of culture, normally considered to be a more complex phenomenon.
- 30



Document 2: A bumblebee pulling a string

<http://www.sciencemag.org>