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Weekly Article #5

While reading, mark the main idea and supporting details. Use different colors or symbols.

## **Bigger isn't always better: bees have tiny brains but are very intelligent**

By PBS NewsHour, adapted by Newsela staff

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Despite their small size, bees are surprisingly intelligent. Researchers at Queen Mary University of London have conducted an experiment showing that bees can learn from their environment to gain a reward and then teach other bees to do the same. And that's not all they can do.

"I think the most important result in our case was that bumblebees can not just copy others but they can improve upon what they are learning," said Olli Loukola, the first author on the study, which was published in the journal *Science*. "This is of course amazing for small-brained insects." Loukola explained that even for humans, "it's difficult to improve on something when we are copying others."

In the experiment, the bees had to move a yellow ball into the center of a platform after the scientists demonstrated how to do it. Some bugs saw the ball move as though on its own, with researchers secretly moving it from below with a magnet. For other bees, the scientists moved the ball with a plastic bee on a stick. When the ball reached the center, the scientists added sugar water to reward the subjects.

### **Bees Learn Quickly**

Once the bees learned that the reward came once the ball was situated in the right place, the bugs began to move the balls by themselves.

The team then placed the trained bees on a platform with untrained bees. After observing the trained bees once, the untrained ones started to carry out the task, too. And not only did they copy the behavior, but the new recruits also improved on the action: They chose balls closer to themselves, even if the demonstrator bee picked a ball that was farther away.

"These are, high, high, highly intelligent creatures. They use the neurons in their brain as efficiently as any other animal on the globe," said conservation biologist Reese Halter, who wasn't involved in the study. "There's little under a million neurons in a bee brain, which is approximately the number of neurons in one human retina." Bees, therefore, have just a small fraction of the amount of brain cells humans have.

Halter explained that bees communicate through head-butting, jostling each other and dancing.

### **Even Small Brains Can Be Highly Complex**

Behavioral ecologist Lars Chittka, who runs the lab where the research took place, authored a study in 2009 on the brain networks of bees called "Are Bigger Brains Better?" The paper concluded that even small brains can be highly complex. Researchers in Chittka's lab have also shown that bees are smart enough to pull artificial flowers out of narrow slots by strings in order to access sugar in them.

Loukola explains that, in the past, the scientific community has sometimes assumed that the smaller the brain, the less intelligent the species. But, he said, "This study is the nail in the coffin that that idea is old-fashioned."

Other research supports the notion of advanced bee intelligence. A 2014 study in the journal *Animal Cognition* found that bees could learn increasingly difficult tasks to access sugar. For example, bees can learn to slide or lift caps, then subsequently push balls of escalating weight to access the reward. When the researchers put the bees who knew how to solve the puzzle in a hive with untrained bees, they somehow went on to communicate the solution to their fellow bees.

<p>1. What is the main idea in this article?</p> <p>2. What are three supporting details?</p> <ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>	<p>3. Identify five transition phrases that show sequence.</p>
<p>4. Define ecologist:</p> <p>5. Identify and define an unfamiliar word:</p>	<p>6. Ask the Author of this article a follow-up question.</p> <p>7. How will knowing the information from the questions help you better understand the article?</p>