Neuroscience education, particularly around memory topics, is lacking for elementary school students. Hands-on, small group activities can help increase student interest and learning in science. This study examined the effectiveness of using an interactive board game called NeuroQuest to teach basic memory concepts to children ages 5-7 years old. NeuroQuest was designed as a collaborative game where players move along a brain-themed board by completing mini-games and demonstrations related to different aspects of memory like episodic memory, short-term vs. long-term memory, the fusiform face area, emotional memory and the amygdala, and auditory memory. The game was facilitated with small groups of children, and a brief oral assessment was conducted before and after gameplay to gauge their prior knowledge, learning, favorite components, and remaining questions. Results showed that while children were highly engaged in the physical gameplay, there were low levels of demonstrated memory concept learning based on the post-game interviews. However, the game successfully piqued children's curiosity about the brain and how it works. The universal design of the NeuroQuest game allows it to be easily adapted for future interactive neuroscience outreach activities on diverse topics beyond just memory. Overall, the study supports the use of captivating, hands-on board games as a promising tool for sparking initial interest in neuroscience education among young students.