

Storytelling and Neuroscience

By Carolyn Hayes, NSTA President 2015–16

I have a degree in biology and taught biology at the high school level, but I didn't truly appreciate neuroscience until after I retired from public school teaching. While participating in a teacher leadership academy, I met Pat Wolfe, EdD, and found myself having many "Aha!" moments about my teaching. Who would have thought that telling stories to my students and having them role-play scenarios would enhance their learning? I knew that my students were having fun, but I never realized the impact I was having on their learning.

After that first encounter, I attended more of Wolfe's workshops and sought out books and articles about neuroscience and how to apply it to

my teaching. The publications *How People Learn* and *How Students Learn Science in the Classroom* also helped me to reflect on why particular strategies were more effective than others. One interesting strategy was the use of stories found in real-world scenarios and literature—particularly those related to scientists' struggles and successes.

Teachers today are realizing the value of literature in the teaching of science and that stories offer a way to connect with all students regardless of their background. NSTA publications such as *Picture Perfect Science Lessons* and *Start With a Story* provide teachers with examples of how to use stories to engage their students and

teach science. Elementary science teachers are developing curricula that incorporate reading into their science classes instead of teaching subjects within silos. College professors are using case studies to help students develop critical-thinking skills. Stories such as that of Henrietta Lacks and the impact her cancer cells have had on science are challenging students to question ideas and analyze findings. Stories that reveal discrepant events place students in the role of problem solver or urge them to determine why one method works better than another.

Why are stories so effective in a science classroom? Storytelling is an important part of the cognitive pro-

cess. Using the principles of neuroscience, teachers are tapping into the power of storytelling to guide their teaching of science and to promote student learning.

Students come to our classrooms seeking ways to link new science content to their past experiences. They are trying to connect what they already know to what is being taught. Telling a story or presenting a real case study causes their brains to search their existing neural networks to find that connection. This results in students asking questions about the story and wanting to know more. These questions lead to experiential opportunities such as a laboratory exploration helping students understand



The logo for the Bright Schools Competition features two large, stylized blue hands reaching upwards to hold a central circular emblem. Inside the emblem is an orange sun with rays and a house icon. Below the emblem, the text "Bright Schools Competition" is written in a blue, sans-serif font. To the left of the emblem, the "NATIONAL SLEEP FOUNDATION" logo is visible. To the right, the "NSTA National Science Teachers Association" logo is displayed. At the bottom left, it says "Registration Opens August 31, 2015". At the bottom right, it says "Entries Due January 29, 2016". Below the hands, there is a stylized black icon of a building or structure. At the very bottom, the website "BrightSchoolsCompetition.org" is written in orange.

NATIONAL SLEEP FOUNDATION

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the content and connecting it to their neural network.

Now ask yourself, “What was my favorite lesson in science class?” Undoubtedly, you were excited, had fun, and felt safe. Emotion is a primary catalyst in the learning process. Because the amygdala, the center of emotion, is so close to the hippocampus, where memories are created, you will have a better memory of these experiences over other ones in which the learning was not very challenging.

Storytelling is an example of a positive emotional experience. After hearing a story, students will want to know “what’s next?” or “how does it work?” This results in more experiential activities and a better learning environment.

Stories are important to our students. They not only “hook” their attention, but they also challenge their thinking. Stories promote curiosity and elicit prior knowledge.

Use stories in an instructional sequence such as the 5E Learning Cycle. Telling a story will get the attention of the student’s brain and provide a means to *engage* the student. The questions students generate will allow their brains to interact with the science content through *exploration*. That exploration creates opportunities for students to *explain* the meaning of what they have learned. Students reinforce the content they have learned by *extending* their knowledge to a new scenario provided by the teacher. Finally, the teacher and students *evaluate* each student’s ability to demonstrate his or her learning of the content.

So tell your stories! Use them to inspire your students, to challenge their thinking, and to have fun. Make sure you also share your stories with other teachers. I hope that when I see you at one of the NSTA conferences, you will tell me your stories and I will tell you mine. My favorite is *As the Cell Turns*. ●



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Quotable

Nature doesn't put the world into silos of science, technology, engineering, and math. We do that.

—Ainissa Ramirez, U.S. scientist and educator

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