

2019 National Teacher of the Year Finalist



Donna Gradel

2019 Oklahoma Teacher of the Year
Broken Arrow High School
Broken Arrow, Oklahoma

Subject: Science, Physical
Education
Grade: 5-12

School Location: Suburban
School Type: Traditional Public

Years in Teaching: 30
Years in Position: 23

District Size: 19,062
School Size: 3,468

Donna Gradel teaches Environmental Science and Innovative Research in Broken Arrow, Oklahoma, where she is committed to unlocking the potential of her students by giving them opportunities to tackle real-world problems. She and her students created the Aqua for Tharaka campaign, which, for seven years, has provided clean water and protein for orphans in Kenya. Under Gradel's leadership, Broken Arrow High School was the first Oklahoma school to receive a Lemelson-MIT InvenTeam grant, which provided funding for her students to research and develop a low-cost, sustainable fish food for developing countries.

Gradel is an executive committee member and co-founder of the "Together Project," a collaboration between the city of Broken Arrow and Broken Arrow Public Schools dedicated to finding environmentally friendly ways to restore and enhance the city's waterways.

Gradel serves as her school's science department chair and is an advocate for STEM curriculum and facilities. In 2015 Gradel was one of ten educators throughout the nation to receive the Henry Ford Innovation Nation Innovative Teacher Award. She was the recipient of the 2017 Presidential Innovation Award for Environmental Educators recognizing her innovative approach to environmental education. She is an Oklahoma girls' basketball state championship coach and Survivor Co-Chair for Tulsa's Susan G. Komen Race for the Cure. Gradel holds a Bachelor of Science and Master of Science from West Virginia University.

Application Questions

1. Describe a content lesson or unit that defines you as a teacher. How did you engage students of all backgrounds and abilities in the learning? How did that learning influence your students? How are your beliefs about teaching demonstrated in this lesson or unit?

During a discussion on sustainable farming methods to combat international food insecurity, one of my students asked, "Why aren't we helping to solve these problems? I heard myself saying, "We can. And we will."

My students know my philosophy. Any other response would have been unacceptable. I constantly encourage them to dream big and make a difference in the world. They know our classroom is a safe, caring place to imagine and not be afraid to fail. In our learning environment, innovation outweighs the final product.

That original question has yielded seven years of student-led international projects to provide clean water and protein to orphans in Kenya. My first step toward that goal was an innovative STEM lesson to design, create and test aquaponic units. The data collected by my students ultimately created a large-scale sustainable system to raise tilapia at an orphanage in the remote Tharaka region of Kenya.

Collaboration on a project this ambitious is critical, particularly when working with teenagers throughout the school day. Students with varying levels of background knowledge and interest chose their own primary roles in small groups. Those who had an affinity for math calculated flow rates, those who liked art helped with visual presentations, and those who had an interest in biology worked with organisms. Teams began to search old storage rooms and dusty closets, salvaging leftover material and recycling decade-old projects for their aquaponic systems. Each member researched their own area of expertise and shared results with other team members. When they encountered problems in the system, they worked together to find solutions – in the process creating an atmosphere of mutual respect. In my classes, this respect and sense of community has translated into considerate discourse when discussing environmental issues where strong opposing viewpoints are passionately, yet respectfully, debated almost daily. This mutual respect is desperately lacking in our world today, and I am proud to play a small part in reversing the tide.

My students' enthusiasm brought them to my classroom before and after school, on weekends and over holidays. They came with a purpose and full of passion – all 132 of them. This engagement poured over into every lesson throughout the year and yielded the highest passing rate on the Advanced Placement Environmental Science test in school history.

Soon, we began Skyping with several University of Nairobi students and a school in Meru. By sharing cultural commonalities and differences with their Kenyan counterparts, my students quickly became part of their global community. I watched as they grew in empathy toward those who did not have access to clean water. In addition to the ongoing aquaponic project, they started a campaign named Aqua for Tharaka to raise money to drill a well, which ignited a passion in them to travel to Kenya to meet the people they were helping and whom they now considered friends. That same empathy elevated their awareness of neighbors in need in our own community, resulting in the collection of hundreds of food items for the local food bank.

The human connection propelled the Tharaka project beyond a science lesson. It became an opportunity to make a positive difference in the real world. The numbers represented more than typical data collected in a lab – they represented protein-rich meals for suffering children.

My students' dream of making a difference came to fruition when a group accompanied me to Tharaka to build the aquaponic system. My students were not just tourists. They lived like our hosts, with no electricity or running water, while completing the project. There is no doubt they learned from their experience, but more importantly, they applied what they had already learned in service to others. Although not every student could travel with us, each took ownership and pride as a contributor of a sustained harvest of thousands of tilapia.

Many of my students find their passion while working on solutions to real-world problems and use those skills to pursue degrees in STEM fields, particularly environmental



engineering. For others, a deepened awareness of and appreciation for different cultures and lifestyles motivates them to travel abroad on humanitarian missions. One former student spent her honeymoon providing medical care in Uganda.

As one of my students who traveled to Kenya on our first trip summarized, “I was by no means an expert craftsman or engineer, but I was still able to make a difference in the lives of children halfway around the world.”

“We will.” Those two words changed so many lives.

2. Describe a project or initiative you have been involved in which contributed to the improvement of overall school culture. What was your role, how did you collaborate with others, and what is the status of this project today?

I didn’t start out with the intention of changing school culture at Broken Arrow High School – I wanted to improve the way I taught Environmental Science to benefit my students. Nonetheless, we ultimately found ourselves knee-deep in innovation.

Eight months after we returned from Kenya to build an aquaponics system, we received word that the commercial fish food cost was exorbitant – over three times average daily wages. The orphanage was struggling to feed the tilapia enough to bring them to harvest, with no foreseeable solution. I can still see the look of disappointment on the faces of my students. Help came in the form of a \$10,000 grant from the Lemelson-MIT Inventeam program, the first in our state’s history. We began a yearlong journey to create a low-cost sustainable fish food.

We collaborated with faculty members, engineers, universities, and businesses under the tutelage of the Lemelson-MIT program. By the end of the school year, we had invented three potential fish food formulas and the working systems to produce the ingredients. Our community rallied around us as we left for Cambridge to present our work. The publicity brought awareness of the need for better STEM facilities, and a much-needed high school STEM facility was added to the district bond initiative, which ultimately passed.

The overwhelming student interest prompted me to create an Inventeam Club, open to all students. On some evenings, dozens of kids, ranging from academically advanced to those with special needs, waited in the hallway to get into the lab. This led to a second student group traveling to Kenya to build the fish food production system and train the orphans on how to produce the food for one-twelfth the previous cost.

Our district administration, impressed by the degree of student engagement, green-lighted my Innovative Research class, now part of our science curriculum. It allows students to choose real-world problems aligned with their passions to make a difference. They research, implement solutions, collect data, and defend their projects.

The class has yielded amazing solutions to problems at home and abroad. One group created electronic board games to reinforce skill sets autistic students need for post-



graduation employment. Another created a mentoring program for elementary English learners focused on raising proficiency scores and buddying with high school role models who speak the same language. Yet another collaborated with specialists from the International Center for Insect Physiology and Ecology in Nairobi to create a sustainable means to feed chickens, resulting in a third group traveling with me last summer to Machakos, Kenya, to provide protein for a school that rescues victims of sex trafficking, child bridehood, and female genital mutilation.

Providing opportunities for innovation creates a culture where students can develop the skills and fortitude for future success. Innovation holds the keys to the future, and I am committed to equipping my students to unlock it.

3. How do you ensure that education transcends the classroom? Describe specific ways in which you deliberately connect your students with the community.

Today's students have a keen concern for the environment and a passion for sustaining the Earth beyond their lifetimes. My environmental science students' instincts led them to start their work close to home.

Seeing a need to improve environmental practices on Broken Arrow's large suburban campus, the class set out on a multi-year journey to elevate environmental awareness and involvement. Our first goal was to reduce our solid waste stream. After initiating a student-led campaign and securing funding, we implemented campus-wide recycling, revamped the paper recycling program, and began composting. What started small grew to a 42-percent reduction in campus waste.

Next, students initiated a sweeping analysis of air and light quality and energy consumption with the help of our state Green Schools Program. After weeks of gathering data, they presented a long-term cost-benefit analysis to our board of education. Their data revealed that in some rooms, air quality failed to meet the most lax health standards. Students were falling asleep, their attention spans shortened and their behavioral issues higher than in well-ventilated rooms.

Within a year, the board of education approved a district energy policy to address my students' findings regarding "vampire energy loss" – electricity wasted when devices or appliance are plugged in – and in the following years, our district installed energy-efficient lighting, vending machines, and ventilation systems and replaced florescent lights. When a devastating ice storm destroyed trees and littered the campus creek with debris, we contacted city officials and the local conservation department to help restore environmental equilibrium. Our goal was to re-establish a healthy habitat using environmentally friendly methods. Although cement and culverts would have been an easy fix, students insisted on re-introducing native grasses and trees to curtail soil erosion and provide the added benefit of carbon sequestration. To measure our progress, they began working with the Blue Thumb organization, which fosters clean-water planting practices, to monitor water quality.

The city took note and solicited our help for a much larger project. The flood control holding pond across the street was experiencing surface runoff infested with fertilizer from surrounding neighborhoods, and algae had begun to erode the water quality and affect local species. City officials collaborated with my students to develop a sustainable solution. The result was a student-driven 2,500-square-foot floating wetland in the shape of our school logo – a gigantic, interlocking “B” and “A” – which actively removed nitrates from the water. Impressed, the public showed their support with a \$500,000 bond to develop the city’s first green park, named “Together Park” to honor our ongoing collaboration. Our assistant city manager called it a “paradigm shift.” The project has evolved into a multi-year joint venture to create environmental learning centers along city waterways with K-12 curriculum.

From that seemingly dark day years ago, when my students wondered how they might make a difference in their world, to the reminder of the wetland they helped build outside our classroom windows, my students know they were the spark that ignited this environmental renaissance.

4. What do you consider to be a major public education issue today? Describe how you demonstrate being a lifelong learner, leader, and innovator about this issue, both in and outside of the classroom walls.

Nelson Mandela said, “Education is the most powerful weapon which you can use to change the world.” Education changed my world. My paternal grandparents immigrated to America with hope for a life free from poverty’s grasp. Through educational opportunities, my father became a lawyer and within a generation changed the social and economic status of our family. His indefatigable spirit instilled in me a passion for learning that continues to this day.

For today’s students, however, the philosophy that all individuals should have equal opportunities to succeed based on their own efforts is not quite as simple. Dr. Robert Putnam, author of *Our Kids: The American Dream in Crisis*, has sounded the alarm that an opportunity gap has emerged in our country that drastically limits upward mobility. The gaps in starting points are wider than they were during my father’s childhood, despite his extreme poverty. This reality is creating glaring inequities in opportunities for our most needy students and leading to a widening achievement gap between rich and poor. One of my first experiences with abject poverty came when I taught in a school nestled in the Appalachian Mountains. Two brothers continued to wear the same unwashed clothing for two months. Several of us pooled our earnings and bought the boys new school clothes. They proudly wore their new duds home, only to return to school the next day in their filthy old clothes. Ashamed, they told me their father had demanded the clothes and pawned them for whiskey.

I quickly recognized that extreme poverty would continue to trap our students in a world of dirt floors and outhouses. The situation required action on my part, so I began organizing



afterschool trips to the nearby university. Slowly, a world of more equal opportunities began to open for my impoverished students.

When I discovered how simplistically I was viewing this complex and tenacious educational issue, I was determined to return to graduate school to gain tools that would equip me to become part of a long-term solution. After a move to a large urban school district and eight weeks of summer training, I discovered inequities again – a startling gap between the haves and have nots. As an educator, I have always believed public education is the key to leveling the playing field. However, students from both ends of the socioeconomic scale must first understand and value one another.

I helped create a project-based biology program that grouped at-risk students with their higher-performing peers. We designed unique afterschool experiences to enhance learning and strengthen the bonds within each team. Chronic absenteeism declined as students grew more excited about the projects and began to recognize that each member of the team had valuable talents and ideas.

I believe education is the great equalizer and the ladder to success. We need to be thoughtful as we address present-day inequities; otherwise, we risk putting the American dream out of reach for some of our young people.

5. As the 2019 National Teacher of the Year, you serve as a spokesperson and representative for teachers and students. What is your message? What will you communicate to your profession and to the public?

From childhood, nature and sports have been two of my defining passions. As I entered middle school in West Virginia at the height of the Title IX era, I dreamed of going to college on a basketball scholarship but found my opportunities limited due to my gender. Mr. Pizzuti, the industrial arts teacher and boys' basketball coach, recognized my ability and love for the game and took bold action: He requested that a girls' team be formed. The administration's refusal infuriated him, and he resolved to give me an incredible, although unpopular, opportunity: He recruited me to play on the boys' team. When it became apparent that I would be named a starter and displace one of the boys, a girls' team was formed.

Mr. Pizzuti's willingness to place his career on the line to champion an equal opportunity for me to play demonstrated the power of a principled teacher. His ability to see my potential catapulted me into an All-State high school career, and as a result, I received one of the first women's basketball scholarships to West Virginia University. As teachers, we have the keys to recognize and unlock the potential of our students and propel them to success. In too many cases, we may be the only positive voice in their world of negative self-talk. We must be their champion.

No matter how much technology advances, nothing has ever replaced or will ever replace the human component of teaching. I have traveled to schools where a piece of chalk was



cherished as a precious jewel and assembly seats were stones on the ground carried to school by each student. I have also visited classrooms where students were building drones and seeking to solve global problems in state-of-the-art science labs. What was important was neither chalk nor drone, but the teacher. We are the most important factor associated with student learning and success. We are the difference-makers for our students.

By empowering students to use critical thinking skills, I help spark exploration, discovery, and innovation. However, high school science can be frightening. Each fall, at least half of my students, particularly girls, enter my class lacking confidence. They shrug off dreams of being a doctor or an engineer, and voices of doubt compete for their attention. They do not recognize their own potential, but I do. By providing them with relevant, yet challenging, opportunities to succeed, I help rekindle their dreams. I become their champion.

For teachers, being a champion is more than extending academic opportunities. We also have the power to ease troubled hearts. Today's students face significant amounts of anxiety and trauma. I am a breast cancer survivor. When I share my story, my students can relate to it because virtually all of them have been impacted by this insidious disease. Many are afraid they will say the wrong thing to ailing friends or family members. We talk about how to communicate with cancer patients and pull down the barriers of fear. Within days, they tell me stories of how they have sat, and laughed, with loved ones.

As a teacher, I help unlock my students' potential to connect with other cultures, to realize their identity and appreciate the uniqueness and value of all humans. On our travels throughout Kenya, my students interacted with the native Maasai community. The instant connection between many of the Maasai and my Native American students was profound. Recognizing the significance of their own ceremonial tribal dress worn during powwows, my Native American students displayed deep respect for the Maasai Shuka and wore the Shuka throughout our entire trip. Almost 9,000 miles apart, two communities of students discovered meaningful connections.

Those connections can even be indirect. One night around 3 a.m., my phone rang, and a recorded voice asked if I would accept a collect call from the county jail. Although not common, I had experienced this situation on several occasions. However, those calls had always come from the girls on my basketball team. This time, it was a player on the boys' basketball team.

"Why did you call me?" I asked.

"I heard the girls talking about how you helped them when they got in trouble, and I need help," said the young man on the other end of the line. He needed someone to see his potential and believe in him. He needed a champion.

He found one in me.

Resume

Education

School	West Virginia University
Degree	Masters of Science
Major	Early Childhood Motor Development
Years Attended	1982-1983

School	West Virginia University
Degree	Bachelor of Science
Major	Physical Education/Biological Sciences(minor)
Years Attended	1977-1982

Certification

Certification	Oklahoma Standard License: Biological Sciences (5-12)
Year Obtained	1991

Certification	Oklahoma Standard License: Physical Education/Health/Safety (PK-12)
Year Obtained	1991

Experience

Title	Teacher-Environmental Science/Innovative Research
Organization	Broken Arrow High School, Broken Arrow Public School District
Years in Position	23

Title	Teacher-Biology
Organization	Nathan Hale high School, Tulsa Public School District
Years in Position	6

Title	Teacher-Special Needs
Organization	Tunnelton Junior High School, Preston County Public School District
Years in Position	4

Leadership

Position	Advisory Board
Organization	National Fund for Teachers
Years in Position	2016-present

Position	State Superintendent's Teacher Advisory Council
Organization	Oklahoma State Department of Education
Years in Position	2017-present

Position	Mentor Teacher
Organization	Oklahoma State Department of Education
Years in Position	1998-2011, 2016-17

Position	Survivor Co-Chairperson, Tulsa
Organization	Susan G Komen Race for the Cure
Years in Position	2018

Position	Executive Oversight Committee
Organization	City of Broken Arrow, Adams Creek Watershed Partnership
Years in Position	2016-present

Awards and Other Recognitions

Award/Recognition	Presidential Innovation Award for Environmental Educators
Year Received	2017

Award/Recognition	Broken Arrow Chamber of Commerce Community Impact Award
Year Received	2017

Award/Recognition	Henry Ford Innovation Nation National Innovative Teacher Award
Year Received	2015

Award/Recognition	Lemelson-MIT Inventeam Award Recipient (\$10,000 Grant)
Year Received	2014

Award/Recognition	Oklahoma Foundation for Excellence Medal for Excellence in Secondary Teaching
Year Received	2014

