

NEWS RELEASE

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A Tumbleweed on Mars: Kenan Fellow, Students Help NASA Roll

FOR IMMEDIATE RELEASE

The tumbling tumbleweed, a symbol of the stark prairie solitude of the American West, may one day roll across the red wastes of Mars on a wandering high-tech search for water and life.

That's the concept behind a NASA project led by Dr. Fred R. DeJarnette, professor of mechanical and aerospace engineering at North Carolina State University, who – in a choice as surprising as a wind-blown weed on Red Planet plains – enlisted a Kenan Fellow teacher and her sixth-grade class to help with design and testing of prototypes.

DeJarnette was serving as NC State mentor for Holly Hanrahan, a teacher at Carnage Middle School in Raleigh and recipient of a 2002 Kenan Fellowship. When she learned of his NASA project, she offered the help of her students. One hundred sixth-grade science students quickly made important contributions to the work of DeJarnette and his aerospace engineering students.

The Kenan Fellows Program at NC State selects public-school teachers for prestigious two-year fellowships, during which they team with university professors while remaining active in the classroom.

According to Hanrahan, her students ran a variety of trials during the semester-long project, based on in-depth research on the planet, and helped select the best materials and shape for the device. "From studying beach balls rolling across a stage to a real tumbleweed blowing in the wind," she said, "the students were inspired to ask questions and generate new ideas for the NASA scientists at Langley Research Center to ponder."

The sixth-graders and the university aerospace students tested four types of tumbleweeds before choosing the design for a Tumbleweed Earth Demonstrator (TED). The sixth-graders' variations were called Tumblecup, Box-Kite, Wedges and Dandelion, each with benefits and

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drawbacks. The winning prototype developed independently by the sixth-graders proved remarkably similar to the device designed by the university seniors – both versions ball-like structures containing power supplies and sensors.

Because it will be propelled by the winds on Mars, all the device's power can be devoted to instrumentation. The high-tech tumbleweed will cover large areas of the planet collecting atmospheric and geological data, which will be relayed to an orbiter and then to Earth.

“Once the project in class ended and students reflected,” says Hanrahan, “the general consensus was that they enjoyed the project and learned a lot about what it takes to create a vehicle from scratch based on the way nature works. They gained an understanding of physics, and they learned about the Martian soil and thin atmosphere. Most important, they learned how to generate questions, research the answers and solve various problems.”

DeJarnette said the project was an opportunity to practice the kind of collaboration vital to complex scientific projects. “Both my aerospace students and Holly's sixth-graders had a challenging task,” he said. “They had to design a wind-driven sensor than can take atmospheric and soil measurements on Mars, with the goal of discovering life on the planet, and then send that data back to Earth. Together, the teams arrived at a solution that shows great promise.”

The middle-school and aerospace engineering students displayed their work at the Festival of Flight this spring in Fayetteville. DeJarnette and Hanrahan presented their findings at an international Planetary Probe Atmospheric Entry workshop in Lisbon, Portugal, in early October. The project was supported by the Space Systems and Sensors Branch at NASA Langley and the NC State Space Grant Consortium.