Team ID: HS40
School Name: STEM Excellence Academy
Area of Science: Environmental
Project Title: Wind effects on a tensile structure with a horizontal membrane

Problem Definition:
Over the past ten years my family has lost many tensile structure with horizontal membranes (AKA our family trampoline) due to high winds picking up the trampoline and transporting it to the neighbor's yard. There seemed to be more conditions at play given any normal windy night and the possibilities if we would have a trampoline in the morning. We have determined the direction and magnitude of the wind relative to the trampoline, our house and our fence seemed to be the most relevant. Although at one point our family had two different types of trampolines and one evening we lost one trampoline while not the other. The goal of this project is to create a computerized system that enables the computer to determine the survival possibility given the magnitude of a particular wind for individual tensile structure with a horizontal membrane system.

Problem Solution:
The environmental wind conditions and the tensile structure with a horizontal membrane mass values appear to be the most relevant variables in determining the structure's survivability.

Progress to Date:
Presently, a simulation has been partially constructed for a few structures modeled within NetLogo. This progress was made possible largely from the assistance of Nicholas Bennett's papers titled, "NetLogo Tutorial Series: Introduction and Core Concepts", "Langton's Ant", and "Set Theory Concepts and Applications". These papers were critical to gaining an understanding to how to set up and use NetLogo given our beginner status.

Within the program we can input different windspeeds and sizes of the structure and the program will decide if the structure will be able to survive. Currently this determination is being determined from actual data of the windspeed to and losses of structures. Thanks to www.weather.com that allowed us to look up the high windspeeds on the specific days in question.

Expected Results:
We are expecting the program to continue to be refined to allow different manufactures of structures, lift calculations rather than the current compare we are using, also to create a visualization to communicate the simulation results.

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