**Blowin’ in the Wind**

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| **5-Part Plan Title:** | **Blowin’ in the Wind** |
| **Engineering Grand Challenge(s) Covered:** | **Renewable Energy and Solar Energy** |
| **Fellow Contributor:** | **Ife Anyansi, Tugce Capraz, Alexa Choy** |
| **Grade Level(s):** | **6-8** |

**5-Part Make-It-Happen Plan**

1. **Learn it:** Learn about how windmills and wind turbines convert wind into mechanical and electrical energy, and evaluate the advantages and disadvantages of this type of renewable energy. Research the different types of windmills and wind turbines, taking note of how their design fits their function.
2. **Do it:** You want to explore the use of wind as a form of energy by designing pinwheels that model windmills. Also, you want to understand the factors that play a role in determining the efficiency of windmills, such as: the material of the blades, the size, the length, the number of blades, the height off the ground, the angle relative to the wind, and the overall design.
3. **Share it:** Research and discuss different ways to build pinwheels from materials provided and/or approved materials brought into class. Creativity is encouraged.
4. **Create it:** After considering the type of materials used and how they may withstand different loads, each group will come up with a final design and build it. While designing/building their pinwheel, they must also incorporate a way for their pinwheel to lift small objects (paper clips, washers). Once each group has built their pinwheel they will bring their device to a station with a hair dryer to simulate wind. Students will take data on how long it takes to lift one paper clip to a height of 6 inches and will test to see how many paper clips/washers their design can lift without failure. They will explore whether the distance/angle of the pinwheel from the hair dryer makes a difference in its ability to function. They will test the hot and cool settings on the dryer to determine whether temperature plays any role in the speed at which the pinwheel lifts the objects.
5. **Teach it:** Evaluate why some pinwheels worked better than others. If your pinwheel failed or was only able to lift a minimum load, come up with ideas of what went wrong and what type of design edits would improve the device’s efficiency.