Wind Study: For a Lifetime

During this activity your students will learn about two 1930s balloon flights launched near Rapid City that provided invaluable scientific data about the nature of the Earth's atmosphere at the edge of space, also setting an altitude record that would stand for 21 years. The students will then participate in a qualitative wind speed study.

Both aircrafts were assembled and sent aloft from an unusual bowl-shaped gorge in the Black Hills. A flat patch of land surrounded by high, steep cliffs provided shelter from wind and the best-possible conditions for inflating and launching large, lighter-than-air craft. The formation is now known as the Stratobowl. According to the USDA Forest service, “The Stratobowl, a natural depression in the terrain of the Black Hills, has 300-to-500-foot sides combined of tree-lined banks and jagged limestone cliffs while the bottom is a flat plain of about 35 acres.”

The Explorer I flight launched July 28, 1934, reached a height of 60,616 feet (11.5 miles) before a rip in the balloon's fabric allowed an uncontrolled release of hydrogen.

Explorer II was launched from the Stratobowl in frigid weather on November 11, 1935 with Captains Stevens and Anderson on board. It's estimated that between 35,000 to 40,000 people witnessed the launch. Explorer II reached a height of 72,395 feet (13.71 miles), an altitude record that would stand for 21 years. (Entire story and archival video footage of the launches)

Activity:

Process
- Introduce the activity by reviewing the information about the historical balloon launches.
- Discuss the importance of launching the balloons from the Stratobowl (natural windbreak).
- Wind Study: For a Lifetime - During this hands-on study, common household items (selected by the students) will be placed outside on a flat open area. The items will be placed at the same location throughout the year at different known wind speeds. Movements of each item will be recorded/charted over a period of many months to establish qualitative data of movement for each item at corresponding wind speeds.
  - Select 5-10 items to chart for the entire year (multiple years would be nice)
    - Possible Items: Standard piece of paper
      - Egg carton
      - Garbage can lid (both up and down on ground)
      - Garbage can
      - Dry leaves
      - Aluminum can
      - Piece of cardboard / box
      - Plastic
      - Etc. (examples of items often seen blowing in the wind)
  - Establish a class observation chart. Record the movement (qualitative data) of each item selected at specific wind speeds (quantitative data). (Example chart for reference)
  - What to expect: Amazing observation skills that your students will take with them forever. Have you ever seen a cardboard box, garbage can lid or piece of paper blowing down the road and wondered how fast the wind was blowing? Now you and your students will know. You will also notice an increased interest in wind storms/tornadoes.

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