Core Skills Analysis

Physics and Engineering

- Learned how basic principles of aerodynamics, such as lift and drag, affect the flight of paper airplanes.
- Gained hands-on experience with design and modification by building and testing different paper airplane models.
- Observed cause and effect by noticing how changes in the plane's shape influence flight distance and stability.
- Developed problem-solving skills by iterating on airplane designs to improve performance.

Mathematics

- Practiced measuring flight distance as part of testing each airplane design, enhancing skills with non-standard units or rulers.
- Potentially explored concepts of angles and symmetry when folding paper to create balanced airplanes.
- Engaged in data collection by recording flight results to compare different paper airplane models.

Critical Thinking and Scientific Method

- Applied experimentation by testing initial airplane designs and revising based on flight outcomes.
- Developed observation skills by carefully watching how each airplane behaved in flight.
- Practiced hypothesis formation by predicting how design changes would affect flight before testing.
- Enhanced analytical thinking by interpreting results and making informed decisions for future tests.

Tips

To expand Drew's understanding of flight and design, encourage creating a variety of airplane shapes to discover how wing size, nose shape, or weight distribution impact performance. Introduce simple data recording techniques like charts or graphs to track flight distances and times, fostering early data literacy. To deepen critical thinking, set up mini challenges such as designing the fastest, farthest, or most accurate flyer. This can make learning competitive and fun while emphasizing problem solving. Additionally, incorporating storytelling—such as imagining the airplane's journey or creating names for designs—can engage creativity alongside scientific thinking.

Book Recommendations

- The Paper Airplane Book by John M. Collins: A classic guide that explains how to fold different paper airplanes and the science behind their flight.
- How Things Fly by David Macaulay: An illustrated introduction to the physics of flight, perfect for young learners curious about the principles behind airplanes and more.
- Awesome Aerodynamics: A STEM Guide for Super Flyers by Shannon Olson: A hands-on book featuring experiments and projects that reveal the secrets of aerodynamics and flight.

Learning Standards

- CCSS.ELA-LITERACY.RI.3.3 - Describe the relationship between a series of scientific ideas or concepts.
- CCSS.MATH.CONTENT.3.MD.A.1 - Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

- NGSS 3-5-ETS1-2 - Generate and compare multiple possible solutions to a problem based on how well they meet the criteria and constraints of the design problem.
- NGSS 3-5-ETS1-3 - Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Try This Next

- Worksheet to record paper airplane designs, flight distance, and observations for comparison.
- Design challenge: Create three paper airplanes each emphasizing a different goal — longest flight, straightest flight, and fastest flight — then test and analyze results.