AERODYNAMIC WING DESIGN

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Introductions

- Name
- How long you’ve been teaching
- Where you teach
- Grade/Subject
- Fun fact
Flight
Bernoulli’s Principle

Bernoulli’s Principle states that the difference in pressure on opposite sides of an object causes an object to move. The object travels in the direction of lower pressure.

- Balloon Demo
- Pingpong Ball/Cup Demo
Objectives for Helicopter Lesson

- Students will explore lift and Bernoulli’s Principle
- Students will create a rudimentary helicopter rotor
Helicopters

Visual

Directions

- Fold paper in half, fold ends back
- Paperclip the fold
- Hold high and release
- Observe any movement or rotation
Build a plane!
Let’s Compare
Wings vs Rotors

<table>
<thead>
<tr>
<th>Helicopters-Rotors</th>
<th>Planes-Wings</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Vertical Movement</td>
<td>□ Horizontal movement</td>
</tr>
<tr>
<td>□ Sway/choppy motion</td>
<td>□ Smooth/gliding motion</td>
</tr>
<tr>
<td>□ Less stable/less weight capacity</td>
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</tbody>
</table>
Objectives for Aerodynamics Lesson

- Students will explore lift and Bernoulli’s Principle.
- Students will utilize the engineering process to build, test and modify a paper airplane.
- Students will analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each to determine the criteria for success.
Plane Design and Modification

- Use the materials provided to build a new plane
  - Fastest
  - Farthest
- Test your plane
- Make any modifications
- Group competition
Debrief

- What materials did you use?
- What design did you use?
- Release technique?
- Anything else?
Connecting with NGSS

- Break into groups of 5
- Identify which standards align with the objective given to your group
- How can you implement this in your classroom