



PROJECT Nº5

Power-Up Paper Planes



AUTHORIZED AMA
STE(A)M PROGRAM

AGE GROUP: 5-13 ADVANCED



PROJECT N^o5

INFO FOR PARENTS

The construction of a rubber-powered rotorcraft is simpler than that of a rubber-powered airplane, but the youngest students might still benefit from an adult's help. The template that is included here will need to be cut out precisely in order to create the box, which may require adult assistance. The AMA Jr. Camp Flight Kits include pre-cut templates, making this project much simpler. Adults may need to assist with winding and launching.

OBJECTIVES

Critical thinking skills: Make predictions and test the hypotheses you come up with!

Engineering: How can we take a working model and make improvements to its performance using technology and our understanding of the physical world?

IMPORTANT TERMS TO KNOW:

Capacitor: A device that stores an electrical charge and then releases it. Think of a capacitor like a temporary battery; it will store the electricity that powers your paper plane while it's charging, then release it when you're ready to fly!

Center of gravity: The point on an object where it will balance freely. If you want to adjust an airplane's flight performance, this should be the first thing you find!

Propeller: A rotating component that produces a force called thrust, which pushes (or pulls) an airplane forward.

Torque: Another force produced by the propeller; since every action has an equal and opposite reaction, the propeller spinning one direction will cause the airplane itself to spin the other! How can we account for this?

Nose: The forward end of an airplane.

Trailing edge: The rear edge of an airplane's wing. This is the best part of a plane to adjust when you're trying to improve performance, especially with power added!

GO FURTHER

How do you think propellers produce thrust?

Look closely at the blades and you'll see that they have a curved shape like the blades of your helicopter's rotor. This shape – called an airfoil – uses Bernoulli's principle, since air flows faster over the curved upper surface than the straighter lower surface. The faster airflow produces lower air pressure, which creates a thrusting force for the propeller!

SAFETY TIPS

NEVER place your fingers anywhere near a propeller blade, whether the motor is charged or not!

Make sure your flying space is sufficiently large and clear of obstacles. Not only do you want to keep things from being damaged, but you want your airplane to have the longest and most successful flight possible!

SUPPLIES NEEDED

Paper airplane (you kept this from Day 1, right?)

Power Set

Charger

Tape

Plenty of open space!

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