

Rubber Band Helicopter

Up, up, and away! Engineer a high-flying helicopter to learn about the forces that make it soar.

TEKS:

SCI 1.8 D: The student is expected to demonstrate that air is all around us and observe that wind is moving air.

SCI 3.6 C: The student is expected to observe forces such as magnetism and gravity acting on objects.

SCI 4.6 D: The student is expected to design a descriptive investigation to explore the effect of force on an object such as a push or a pull, gravity, friction, or magnetism.

Materials:

- Craft stick
- [Craft stick propeller](#) (fits onto end of craft stick and has a rubber band hook)
- Notecard
- Paperclip
- Pencil
- Rubber band (size #64 works best)
- Scissors
- Tape

How To:

1. Draw a helicopter shape onto the notecard and cut out your design.



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2. Pull the inner and outer loops of a paperclip apart so that the paperclip forms a "V" shape.



3. Tape the larger loop of the paperclip to the bottom of the craft stick. Make sure that the small loop of the paperclip is sticking out with the loop opening downward.



4. Attach the propeller to the top of the craft stick, taping to secure, if needed.



5. Tape the paper helicopter to the craft stick, below the propeller. Make sure the paper helicopter is on the opposite side of the stick from where the paperclip is poking out.

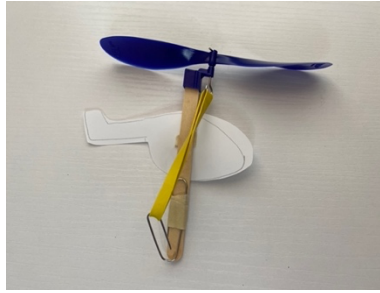


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- Hook a rubber band on the end of the paperclip and the propeller.



- Wind the helicopter by holding the bottom of the craft stick steady while turning the propeller. This will twist the rubber band.
- After turning the propeller many times (at least 20, and up to 100!), let go of the propeller, then let go of the base of the craft stick half a second later. Watch it fly!

STEM Explanation:

How does the helicopter fly? When you turn the propeller, you are creating a type of energy called potential energy in the rubber band. Potential energy is stored energy. When you let go, the rubber band untwists, and its stored potential energy becomes another type of energy called kinetic energy. Kinetic energy is the energy of motion. The kinetic energy turns the propeller and the helicopter cutout. As this happens, the cutout is big enough that it pushes against the air around it, which prevents it from spinning very much. This means more energy can go to the propeller, keeping it turning. The spinning blades of the propeller push air downwards, creating force. There is also an equal and opposite force called lift that pushes the helicopter up. When the force of lift is stronger than the force of gravity, the helicopter flies up instead of falling down to the ground!

Career Connection:

Aeronautical engineers design and develop machines that can fly. They create newer, safer, and more energy-efficient methods for travel, including airplanes, helicopters, missiles, satellites, and spacecraft.

Resources:

https://www.nasa.gov/sites/default/files/atoms/files/aam-rubber-band-powered-helicopter-engineering-challenge-student-guide_0.pdf

<https://stemazing.org/wp-content/uploads/2017/08/instructablesRubberBandHelicopters.pdf>

<https://www.instructables.com/Rubberband-Helicopters-step-by-step/>

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