



RC HELICOPTER REVERSE ENGINEERING

VIQC Elementary School - 2023 Challenges

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Object Selection:

All of us on our team have always loved radio-controlled cars and helicopters. Rc helicopters are what we all love but we are all still curious about how they work. How does a Rc helicopter defy gravity for so long? What is the force that keeps it in the air? What are the different pieces used to build one? To find the answer to our questions, we decided to reverse engineer a rc helicopter and see what the force was that made the helicopter fly in the air.

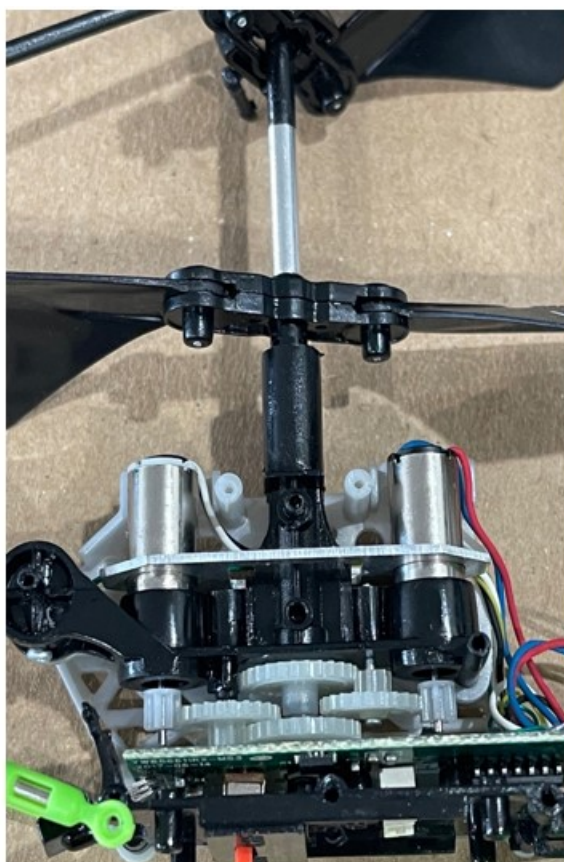
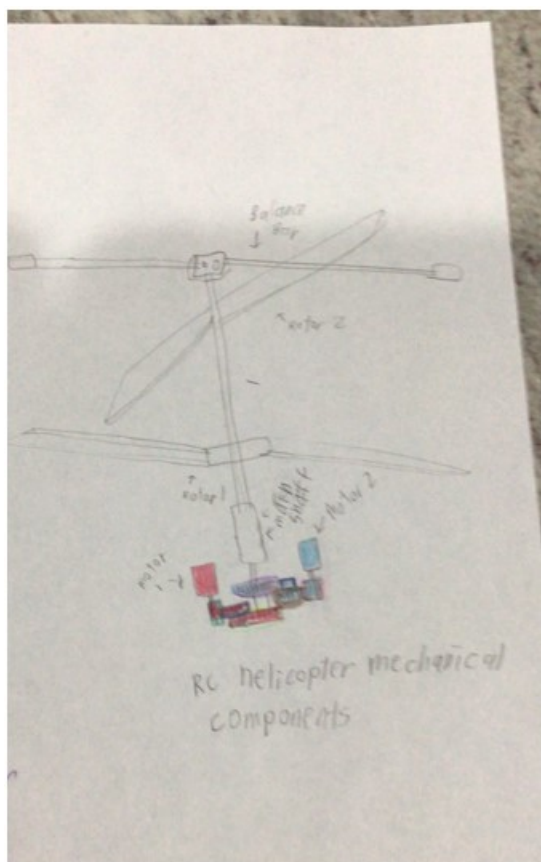


Product specifications






- Product name: Surge remote control helicopter
- Dimensions: Remote control helicopter 8.6in 4.4in
- Maximum flying height: 32 feet
- Use: Indoor use only
- Color: green
- Powered by 3.7v lithium battery


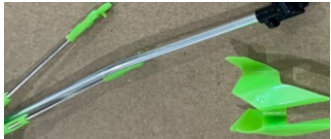



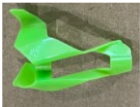
Basic Principles of RC Helicopter:







The remote control has the options to go up, down, right and left. There are three motors that power the helicopter. The first two power the rotors. The third one powers the tail rotor. The first rotor is used to take off from the ground. The first rotor has to go so fast that it lifts the helicopter up into the sky. The second rotor goes, right or left by spinning faster than the other rotor. By spinning the second rotor faster than the other rotor, the helicopter goes in the direction of the faster one. The third motor powers the tail rotor. The tail rotor helps the directions and balance the helicopter.










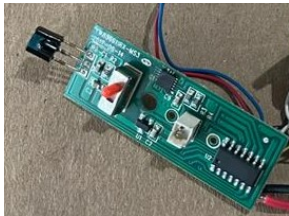


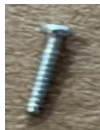

Parts List and Function of part:







Part Picture	Part Name	Quantity	Area	Function
	Bracket	1	Main drive train area	supports the receiver
	Battery	1	Main area	powers the motor and basically runs everything
	Motor	3	2 Main drive 1 tail fan	powers the gears and rotors
	Main Frame	1	Support for main mechanism	Holds all the pieces together and adds colors
	Steel Bracket	1	Main area	Holds all the mechanical components together

	Steel Rod (Short)	2	Tail	connects the tail rotor to a motor
	Steel Rod (Long)	1	Tail	connects the tail rotor to a motor
	Tube	1	Tail	conceals the wires from view
	Support	2	Tail	holds the wires to the helicopter
	Fan Blade	1	Tail	powers the tail of the helicopter
	Plastic cover	1	Tail	holds together the tail of the helicopter


	Plastic clamp	1	Tail	attaches to the tail of the helicopter
	Front cover	1	Outer Body area	conceals the mechanical body
	Back Cover	1	Outer Body area	conceals the mechanical body
	Bracket	1	Front cover support	supports the insides of the helicopter
	Bracket	1	Back Cover support	supports the insides of the helicopter
	Bracket	1		holds the insides by the sides

	Bracket	1		holds the insides by the sides
	Skid	1	Legs	supports the helicopter for when it lands
	Balance Bar	1	Fan area	holds the top rotors together
	Fan Blade (Left)	2	Fan area	spins around to change direction and take off
	Fan Blade (Right)	2	Fan area	spins around to change direction and take off
	Fan manifold	1	Fan area	to spin both rotors at the same time

	Main Shaft	1	Drive train	a shaft that powers most of the rotors
	Receiver	1	Drive train	receives the signals from the controller
	Gear set	2	Drive train	set of gears that spins a gear
	Gear	2	Drive Train	directly spins rotors
	Tall Screw	6		used to hold in 3 components
	Medium Screw	9		used to hold in 2 components

	Small Screw	25		used to hold in 1 component
	Gear	2	Drive train	powers to the big gear
	Red Wire	2		connects the receiver to the motors
	Blue Wire	1		connects the receiver to the motors
	White Wire	1		connects the receiver to the motors
	Black Wire	2		connects the receiver to the motors

	Green Wire	1		connects the receiver to the motors
	Yellow Wire	1		connects the receiver to the motors
	Weight for Front	1		weigh down the front so it isn't unbalanced
	LED Light	1		add a little flare to the design
	High Capacity Red Wire	1	Battery to Drive train	conducts more electricity
	High Capacity Black Wire	1	Battery to Drive train	conducts more electricity

	Switch	1	On and Off	turns power on or off
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Summary

There are many different pieces in a helicopter that make it fly. For example, the outer plates hold the pieces in, so they don't fall out and they also make the helicopter look pretty. The motors and the gears help the helicopter take off. The screws hold everything together. A rc helicopter operates by the controller sending a signal to the receiver. The receiver then transfers the signal to the motors. The motors turn the gears which turn the rotors. The rotors then go in the direction the gears are spinning in and then they take off. In conclusion, the components in a helicopter are crucial for the helicopter to fly.



Here is the video link for this project (Click on Link to Watch on Youtube):

<https://youtu.be/SNZOCIsKkFc>

