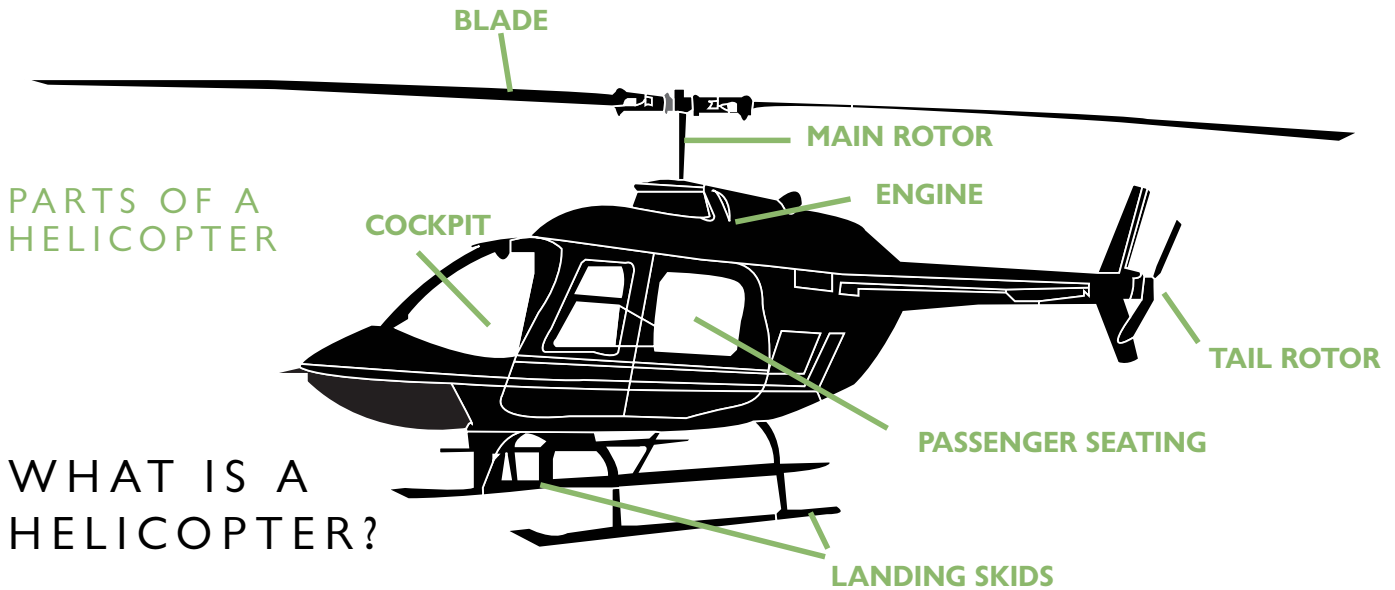




BELL HELICOPTER
AND WOMEN IN AVIATION
INTERNATIONAL ARE PROUD
TO PROVIDE EDUCATIONAL
INFORMATION AND ACTIVITIES
FOR STUDENTS.



HELICOPTERS



WHAT IS A HELICOPTER?

A helicopter is a type of aircraft that uses rotating, or spinning, wings called blades to fly.

Unlike an airplane or glider, a helicopter has wings that move.

Unlike a balloon, a helicopter is heavier than air and uses an engine to fly.

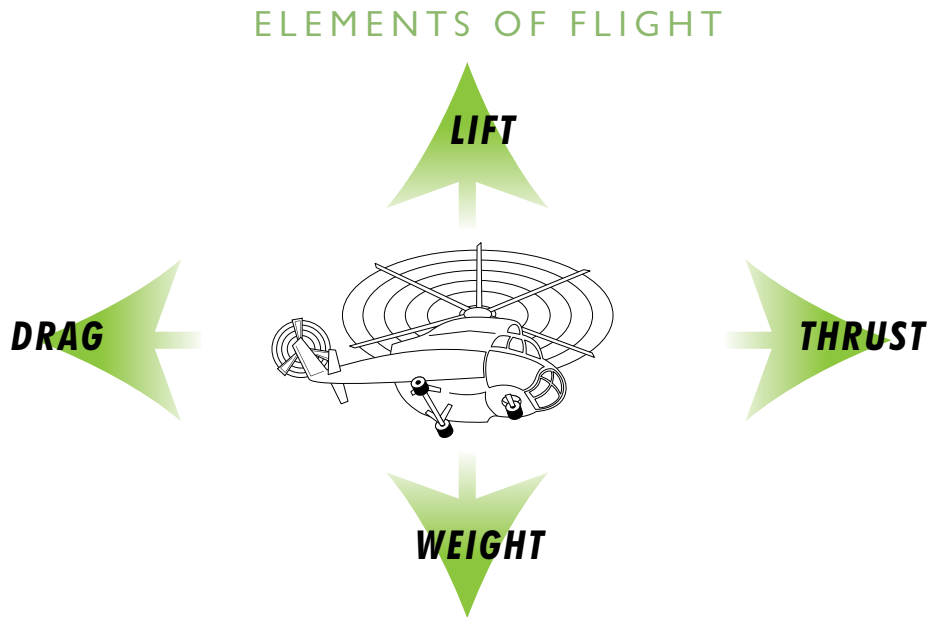
A helicopter's rotating blades, or a rotor, allow it to do things an airplane cannot.



A Textron Company



HOW DOES A HELICOPTER WORK?



In order to fly, an object must have “lift,” a force moving it upward. Lift is usually made by wings. Wings create lift because of a relationship called the Bernoulli Principle. The Bernoulli Principle describes how the speed of air and the pressure in the air are related. When the speed goes up, the pressure goes down and the opposite is also true.

Wings are generally curved on top and flatter on the bottom. This shape is called an airfoil. That shape makes air flow over the top faster than under the bottom. As a result, there is less air pressure on top of the wing; this causes suction and makes the wing move up. A helicopter’s rotor blades are wings and create lift. An airplane must fly fast to move enough air over its wings to provide lift. A helicopter moves air over its rotor by spinning its blades.



WHAT CAN A HELICOPTER DO?

A helicopter's rotors allow it to do things an airplane cannot. Unlike an airplane, a helicopter does not have to move quickly through the air to have lift. That fact means it can move straight up or down. Most airplanes cannot do this. A helicopter can take off or land without a runway. It can turn in the air in ways airplanes cannot. Unlike an airplane, a helicopter can fly backwards or sideways. It also can hover in one spot in the air without moving. This makes helicopters ideal for things an airplane cannot do. For example, a helicopter can pick up someone with a medical problem up where there is no runway. It can then land in a small area on top of a hospital.



AW139 Helicopter on search and rescue exercise



A U.S. Army Bell AH-1G HueyCobra in flight



Sanji Chhat helipad, Vaishno Devi Bhawan, 6000 feet above sea level



WHAT ARE USES OF HELICOPTERS?

Helicopters can be used for many things. They can be used as flying ambulances to carry patients. They can be loaded with water to fight large fires. Military forces use helicopters to attack targets on the ground and move troops. Helicopters are used to get supplies to ships. Helicopters can be used to transport large objects from place to place. Helicopters can rescue people in hard-to-reach places like mountains or in rough seas. Television and radio stations use helicopters to fly over cities and report on traffic. Helicopters are used by police and by people on vacation. These uses are just some of the many things that can be done with helicopters.



Kern County Fire's Bell 205A++ departs from the Mojave Spaceport. Photo Alan Radecki



An Osprey MV-22 used during a MAGTF demonstration during the Miramar Air Show 2014



Helicopter Bell 47. Photo by Stefan Krause, Germany





USES OF HELICOPTERS IN THE COMMUNITY

Firefighting

Traffic reporting

Emergency rescues

Inspecting power lines to make sure they work properly

Transportation of people and cargo

Construction

Search and rescue

Disaster management

Tourism

Medical transport/air ambulance/transplant organ transport

Law enforcement to pursue suspects

News and media

Aerial observation

Military

Maintenance and transport to off-shore facilities such as oil rigs

Aerial photography

Movie photography

Forest rangers use helicopters to assess and inspect the forest

Farmers use helicopters for insect/pest control and to prevent crop diseases

Government agencies use helicopters in crisis situations such as floods, hurricanes and tornadoes to bring aid to people when other aircraft cannot enter the area





RESEARCH:

1. Who invented and built the first helicopter?

2. Discuss other uses for helicopters, or what you may have seen on the news or on television.

More images on the Bell Helicopter site: <http://www.bellhelicopter.com>

Research the history of helicopters at <http://www.helis.com/timeline/bell.php>



Helicopter Activity

OBJECTIVE:

Learn about the forces of flight – gravity, drag and lift

- Drag depends upon factors such as the shape of a helicopter blade.
- Weight/gravity is a force that increases by adding mass.
- Lift is the upward force that keeps the helicopter in the air – it must be greater than weight/gravity in order for the helicopter to fly

WORD BANK

*lift, weight,
gravity, drag,
blades*

MATERIALS:

Helicopter template provided, scissors, paper clips of various sizes

BACKGROUND:

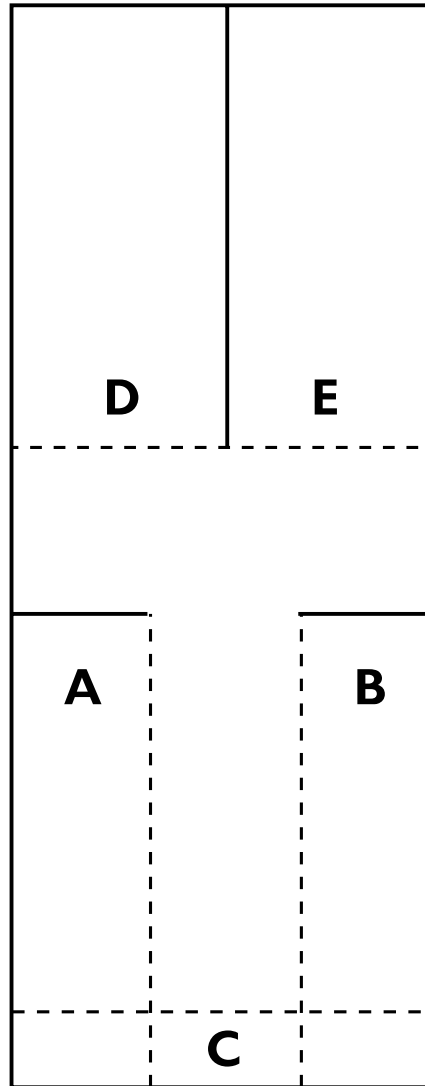
Air has mass and takes up space. When you drop your helicopter, it has to push the air around it out of its way in order to move. As your helicopter falls, the pressure of the air pushes the blades up into a slanted position. In this position, the air under one blade is pushing one way while the air under the other blade is pushing the opposite way. These two forces of air push the blades around and make it spin. The faster the blades spin, the less the air can get by and the slower the helicopter falls. By experimenting with the weight, shape, and position of the blades, you change how fast and how much air is pushed out of the way – changing the resistance of the air hitting your helicopter, affecting how it moves.



Helicopter Activity

PROCEDURE:

1. Cut the helicopter template only on cut lines, see example at right. Find other examples at websitein10.com/paper-helicopter-template.html
2. Fold flaps A and B toward each other so they overlap
3. Fold flap C up. Hold your helicopter up and high and drop it. What happens?
4. Fold flaps D and E in opposite directions to form the blades. Fold D towards you and flap E away from you. Hold your helicopter up high and drop it again. What happens this time?
5. Experiment with the weight or shape of your helicopter. How does it affect flight when you:
 - Add a paper clip to the stem
 - Add two paper clips
 - Fold the stem to make it shorter
 - Make the blades jagged or rounded
 - Bend the blades the other way





Helicopter Activity

WHAT IS A HELIPAD?

A helipad is a location where a helicopter can safely land. In larger cities, a helipad may be located on the roof of a building. In rural areas, one might be located in a clearing free from overhead wires and trees.

Many larger hotels, hospitals, factories and even large ships have a helipad.

The helipad is easily identified by a large “H” inside a circle on the landing surface. A helipad for medical purposes will have a cross.



Helipad at Buffalo General Medical Center, photo by Kaleida Health



Helipad at Crystal Tower Business Center, Bucharest, Romania

PROCEDURE:

1. Create a paper helipad and place on floor.
2. Use your helicopter from page 9 to practice landing.



RESEARCH:

Visit an online mapping software such as GoogleMaps, type in “heliports” to discover where helicopters land near you.

