QUICK PROJECT
PAPER
HELICOPTERS
A brief history of helicopters

A toy known as a hand propeller was invented in China around 400 BCE and in many ways is a very simple helicopter. These toys, also known as puddle jumpers, were introduced in Europe over a thousand years later during the Renaissance. Renaissance artist and inventor Leonardo da Vinci may have been inspired by hand propellers and developed something similar he called the ‘helical aerial screw’.

da Vinci’s design, measuring at 15 ft in diameter, called for four people to turn cranks that would rotate the shaft. He theorized that given enough power, the displacement of the air by the screw’s rotation would allow the prototype helicopter to achieve lift. Unfortunately, modern tests have proven that the aerial screw would not have had sufficient power to fly.

However, da Vinci was correct about one thing - the rotation of the screw (or propeller blades, in a modern helicopter) does in fact compress air in order to achieve flight!

Helicopters employ the four forces of flight in a different way than airplanes do, and the forces of lift and thrust must be combined in order to overcome gravity due to the position of the propeller.

Depictions of toy helicopters soon made their way into art. Here are some examples from the 15th and 16th centuries!

**PAPER HELICOPTER**

Instructions:
1. Print as many copies of the Paper Helicopter template as you will need.
2. Cut out the helicopter templates (there are 9 per sheet).
3. Fold on the dotted lines “A” and “B”.
4. Fold on the dotted line “C”.
5. Fold on the dotted lines “D” and “E” so that the helicopter resembles a capital “T”.
6. The paper helicopter flies better the greater the height from which it is released, so try dropping the Paper Helicopters from the second floor of your home, or from the top of a ladder. You can also throw them in the air!

**CHALLENGE**

1. Try to figure out whether the helicopter turns clockwise or counterclockwise, and why that may be.
2. Unfold “D” and “E” and fold them again, except going the opposite way. Does this change the direction of the rotation?
3. Try adding weight to the Paper Helicopter by adding a paperclip to the bottom. Does this make the helicopter rotate faster? Does it fall quicker?
4. Try printing the Paper Helicopter on different weights of paper. Does regular printer paper work best, or does something thicker like cardstock work better? You can also trace an unused template on an envelope, manila folder, or postcard!
5. Make larger helicopters! How does this change affect the flights?

**LEARN MORE!**

For in-depth curriculum and worksheets visit AMAFlightSchool.org/ArconicSteam and download the aerolab materials!