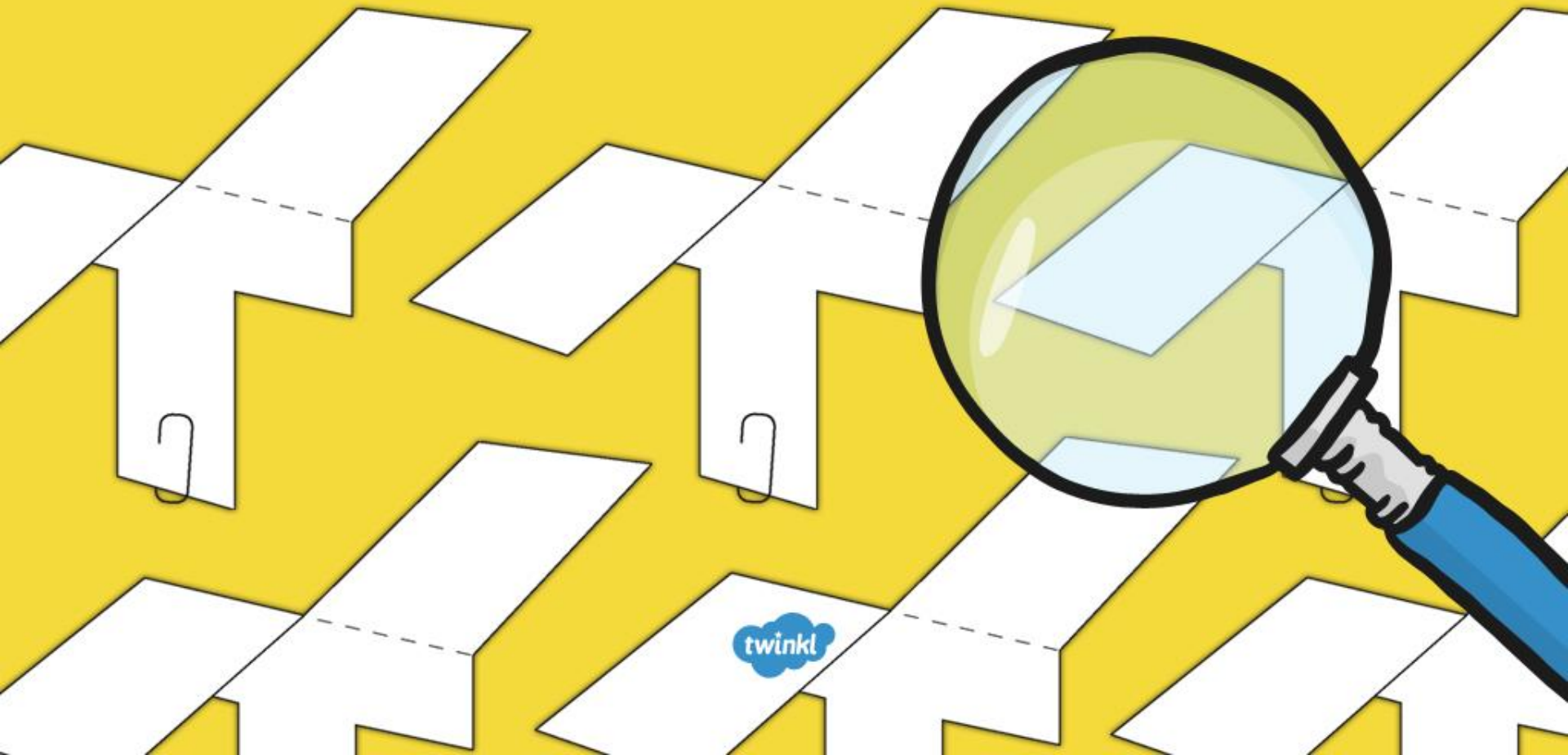
Investigating...

Paper Helicopters



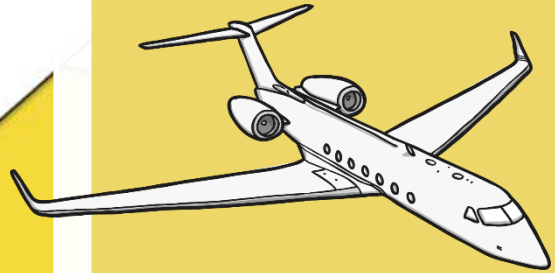
Aim

- To investigate how changing variables on a paper helicopter affects the speed at which it falls through the air.

What is ‘flight’?

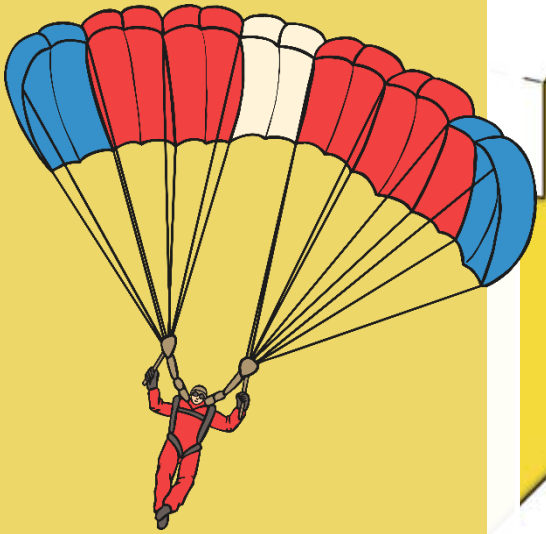
Can you identify an ‘odd one out’ and give a reason for your answer?

There is no right or wrong answer so be as creative in your thinking as you can!



aeroplane

helicopter



parachute

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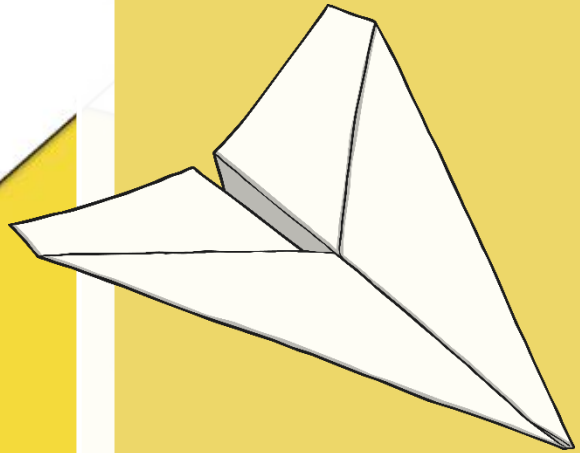
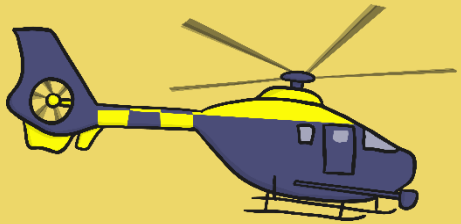


paper plane

sugar glider



helicopter

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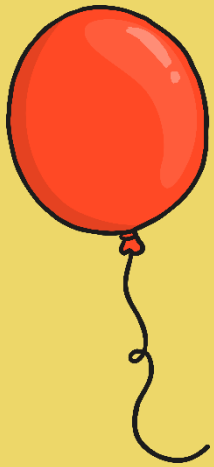
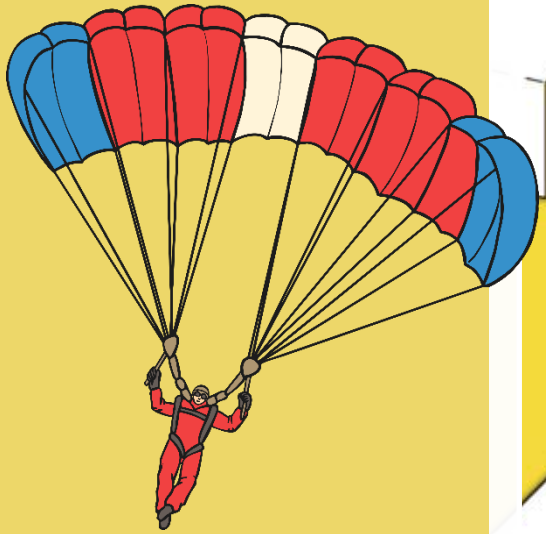
bird



balloon



parachute

What is ‘flight’?

Well done for thinking so carefully about those choices.

Objects can be airborne in a number of different ways:

float **glide** **fly**

Can you write a definition which describes the difference between each and can you think of an example of something which fits each description?

Check what a dictionary says when you have finished!

Helicopters

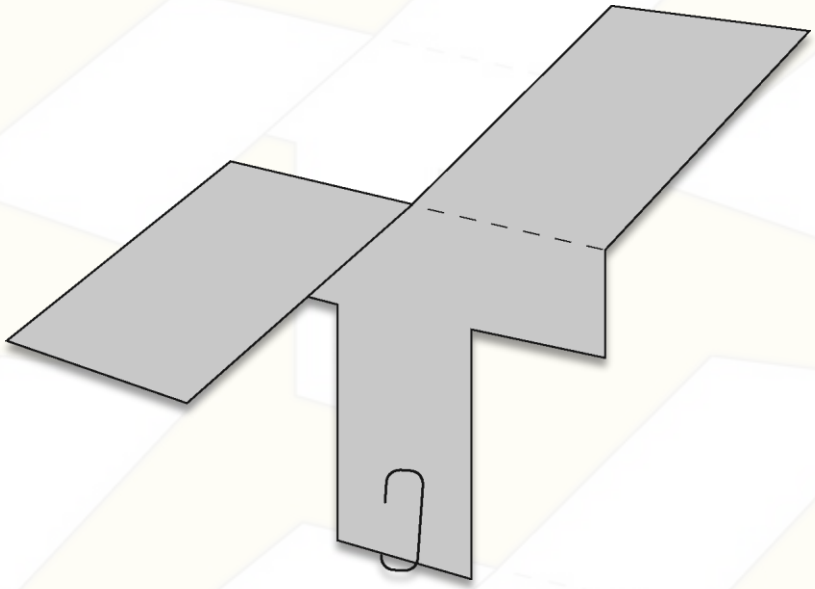
How do you think they work?

What different types have you seen?

What might make them work better?

Challenge

You are going to make some paper helicopters, then see how long we can get them to stay in the air for.

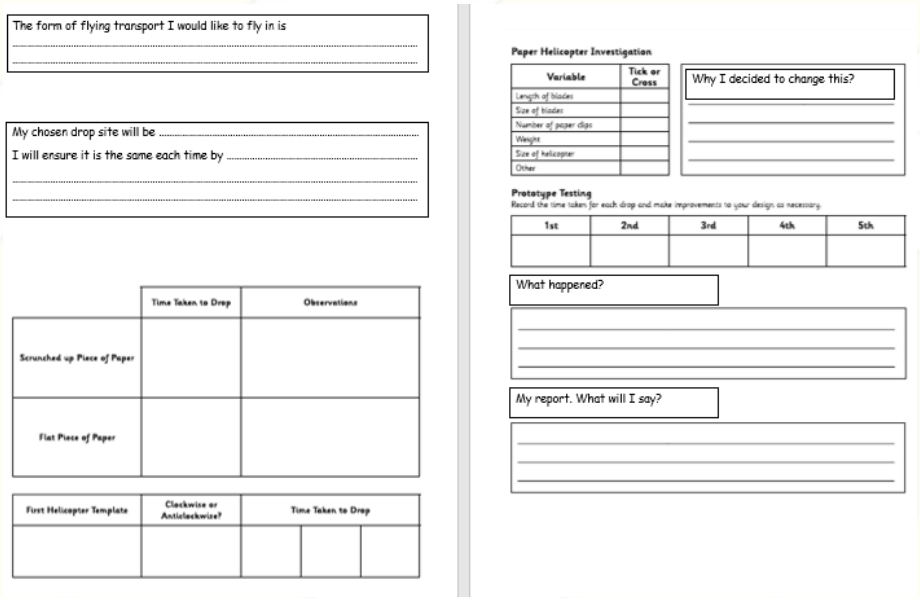


Challenge

You will need the materials listed on the next page.
Simply follow the steps on this presentation.

For each of the steps, there is a corresponding section on the HELICOPTER REPORT SHEET.

Good luck!


The form of flying transport I would like to fly in is .....

My chosen drop site will be .....

I will ensure it is the same each time by .....

	Time Taken to Drop	Observations
Scrunched up Piece of Paper		
Flat Piece of Paper		

First Helicopter Template	Clockwise or Anticlockwise?	Time Taken to Drop		

Paper Helicopter Investigation

Variable	Tick or Cross
Length of blades	
Size of blades	
Number of paper clips	
Weight	
Size of helicopter	
Other	

Why I decided to change this?

Prototype Testing

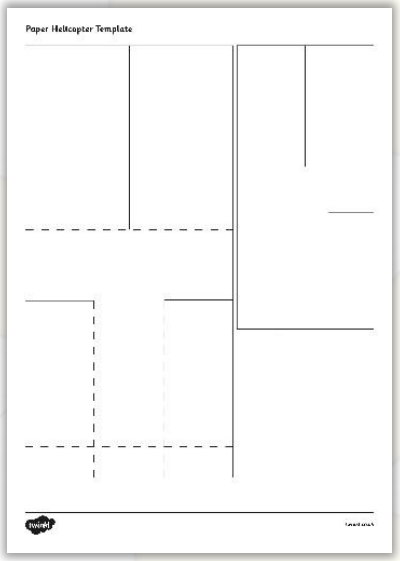
Record the time taken for each drop and make improvements to your design as necessary.

1st	2nd	3rd	4th	5th

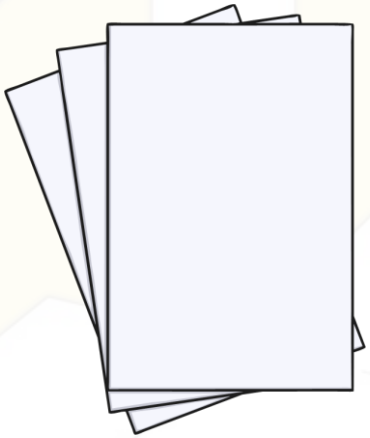
What happened?

My report. What will I say?

You will need:



Several sheets of blank A4 paper



A3 paper

Paper clips

Copies of the Helicopter template

Scissors

Stopwatch (or phone with stopwatch)

One helicopter report sheet

Step 1

Getting Started Question

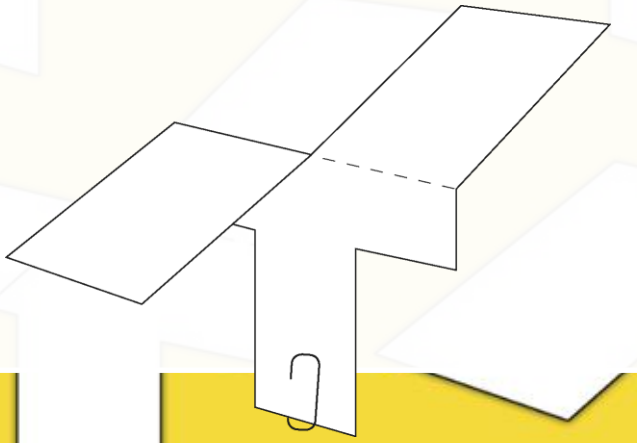
Which form of transport would you most like to fly in?

Step 2

Find a drop site to use for your trials. You need to find a way to ensure that your helicopters are dropped from exactly the same height each time.

Caution! If you decide to stand on a chair or a table, check with an adult and take extra care!

Practice timing exactly how long things take to drop to the floor. Press start on the stopwatch as soon as they are dropped and stop on the stopwatch as soon as it hits the floor. Look at the object rather than the stopwatch or ask someone in your house to shout out '**Start**' and '**Stop**'.

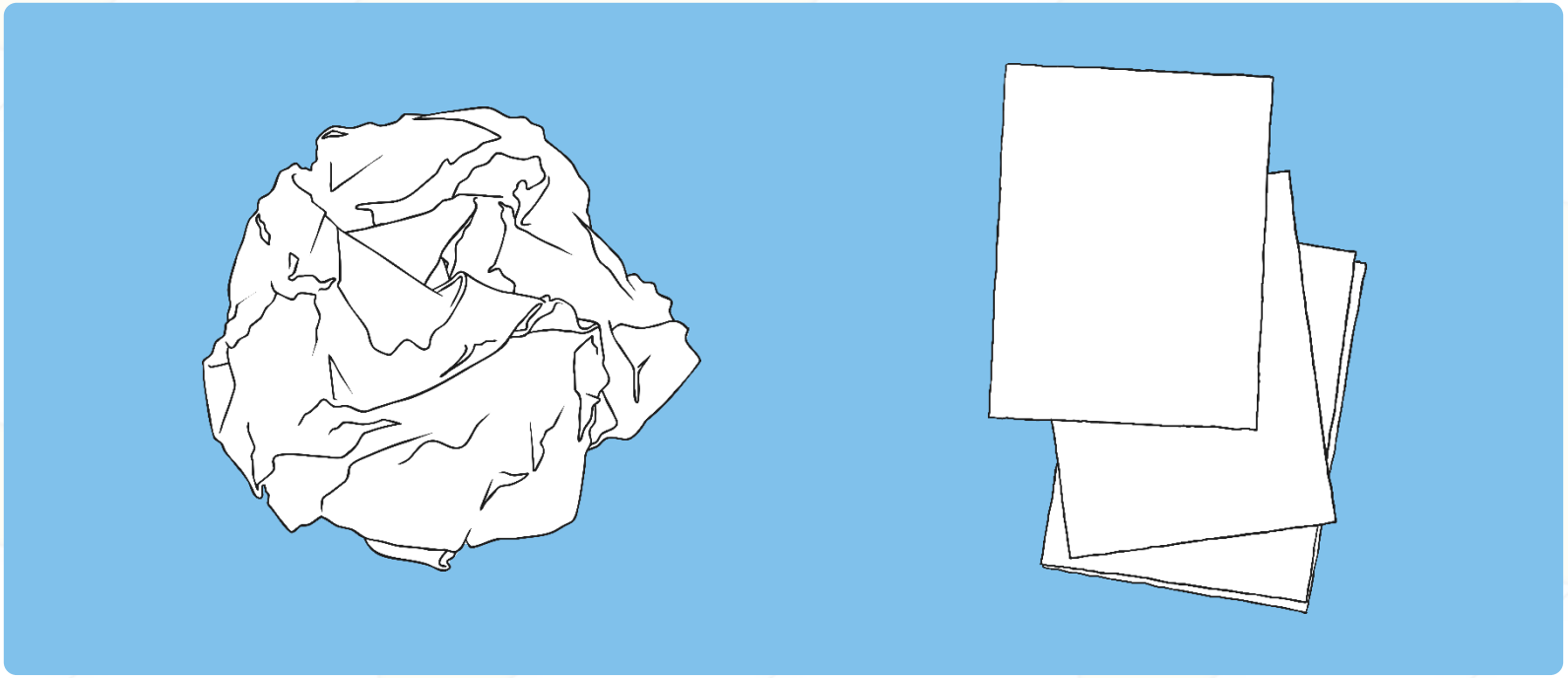


Step 3

Drop a piece of flat paper and a piece of scrunched up paper.

Time how long they take to reach the floor and record it.

What do you notice?

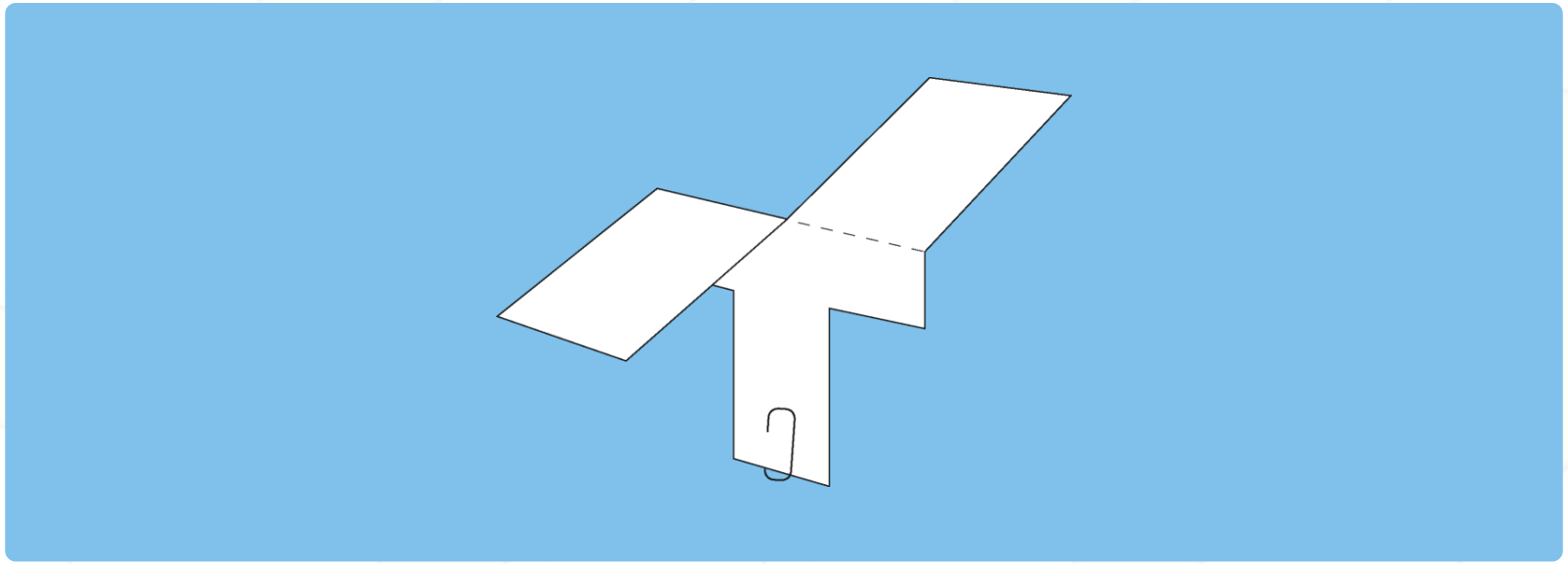


Step 4

Make your first paper helicopter.

Use the template provided. Then drop your helicopter until you are happy with the way it is working.

Does it turn **clockwise**? Or **anticlockwise**? How many seconds does it take to reach the ground?



Step 5

Now for your challenge!

Change something about your helicopter. Can you adapt it so it stays in the air for the longest possible time?

Variables you may wish to think about altering are:

- length, size or shape of the rotor blades;
- weight i.e. number of paper clips;
- the size of the helicopter – you could scale your version up or down.

Can you think of any other changes that you can make?

Before you do anything, decide what you will change about the design of your paper helicopter. Think of reasons of why you think your changes will make the helicopter fly for longer.

Step 6

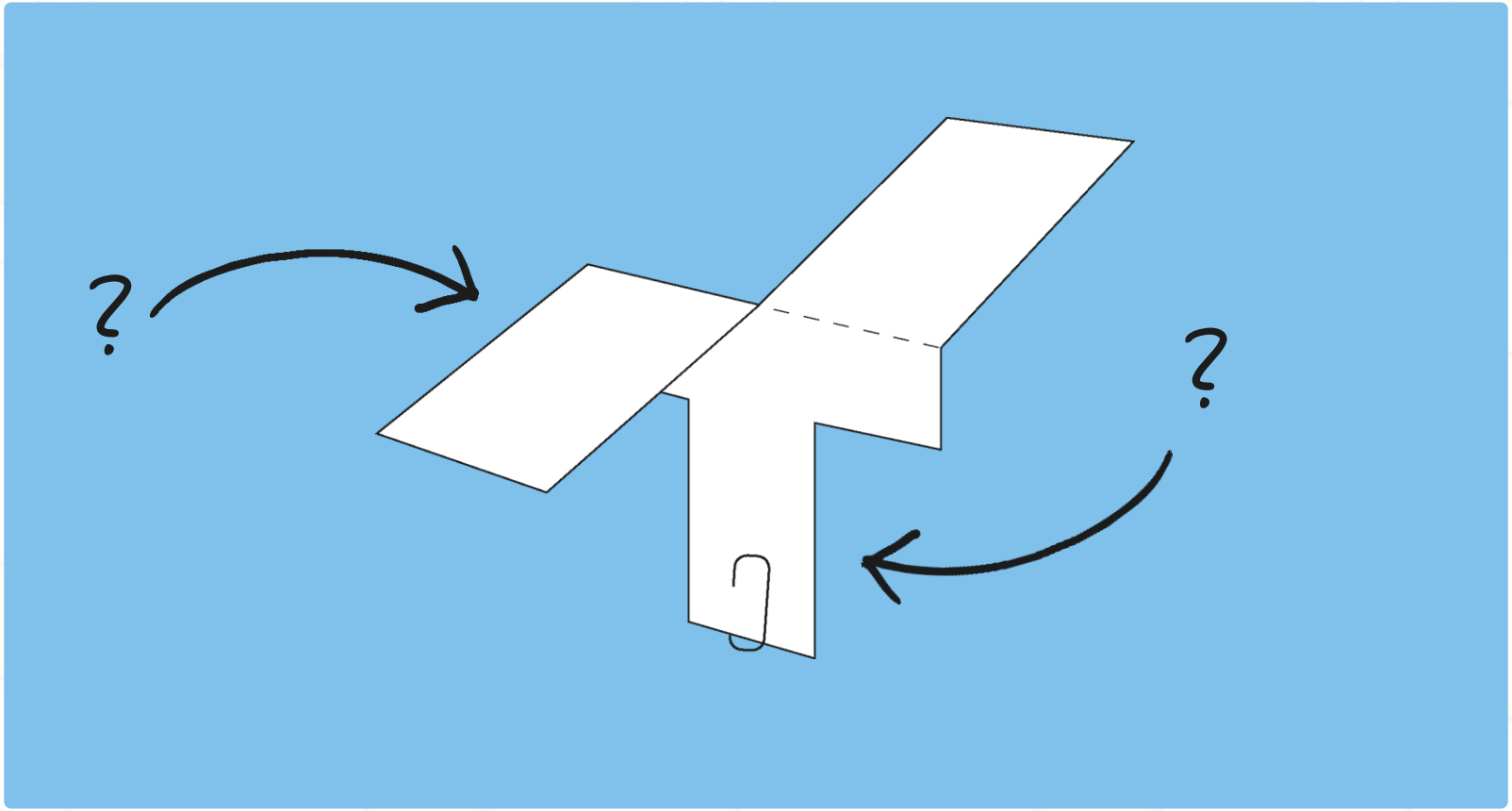
Design, make and test a prototype of your design.

Make your first test drops.

How long does it take the helicopter to drop to the floor?
How does this compare with the first drop of the original helicopter?

Step 7

Can you suggest any improvements to your design?



Step 8

Helicopter Report

Make sure you include the following information:

- what you changed;
- why you changed it;
- whether it worked;
- and why you think it worked or didn't work.