



# Check this out!

## The Train and The Kingfisher Bird

### Have you ever heard of biomimicry?

It is when we mimic (in other words copy) events or actions that happen in nature. It helps us design and invent things and systems to solve problems.

### Biomimicry in action

Japan have fast trains called Shinkansen bullet trains. They travel up to 300 km per hour, that's over 186 miles an hour! Once they were designed, engineers realised these trains were causing a sonic boom when they emerged from tunnels. This 'boom' was so loud it woke up the people living nearby and also disturbed wildlife. This was due to changing air pressures.

Engineers discovered the 'boom' was linked to the shape of the train's face. A cushion of air was building up in front of the speeding train. One engineer, who was trying to solve the problem was a birdwatcher. This turned out to be very useful.

He had seen a kingfisher bird diving through the air into a river. He noticed it only made a small splash as it entered the water. He was curious to see what would happen if the engineers copied the shape of the bird's face at the front of the train. The team created the front of the train like the kingfisher's face, with a point at the front just like a kingfisher's beak. When tested, the train travelled out of the tunnel without creating the 'boom'. The design was more aerodynamic than before and this also saved energy.

**Try the Paper Plane Designs Curiosity Challenge to explore what makes something more / less aerodynamic**



Are you curious enough to take on our challenge?

## Paper plane designs

1.

### The question

How does the design of a paper plane effect its flight?

.....

2.

### The equipment

- 3 sheets of A4 paper (this can be any colour or you can colour it yourself)
  - Small items with which to change the design (for example; paper clips; blu-tack; small pieces of card; string)
  - Measuring tape
  - Paper and pens to record distances
- .....

3.

### Create a fair test

- To measure and discover what design changes effect the straightness and/or distance a paper plane can fly. Make a paper plane (See How to Make a Paper Plane sheet).
  - Maybe try one of these, or similar, on each of your planes; adding blobs of blu-tac to the plane or using string on the nose or front or back or using paperclips to reshape the plane's structure.
  - Record how straight or far they fly now.
- .....

4.

### Sharing results

Tick your chosen method

- |                                    |                                       |                                      |
|------------------------------------|---------------------------------------|--------------------------------------|
| <input type="checkbox"/> Graph     | <input type="checkbox"/> Presentation | <input type="checkbox"/> Photographs |
| <input type="checkbox"/> Pie Chart | <input type="checkbox"/> Report       |                                      |

Where will your curiosity take you?





# How to make a paper plane

