



Birds

# Flights and forces

Age: 7-14

Topic: Art and Physics

Time: 1 hour



Learning through Landscapes

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## What should learners already know?

- Birds use their wings to fly.

## What equipment will I need?

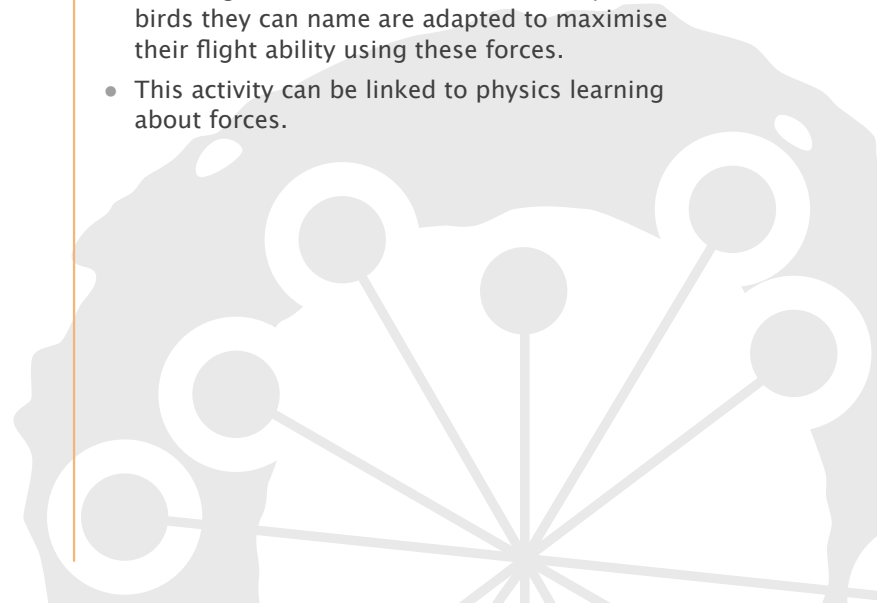
- Print-out of the 'Make the bird fly' PDFs
- Colourful pens and pencils
- Scissors
- Glue stick

## How will learners explore this?

1. Explain to the children that there are four forces affecting a bird in flight. You will be investigating them today:
  - Lift: Acting upwards, generated as the bird travels through air.
  - Weight: Acting downwards, due to gravity.
  - Thrust: Acting in the direction of flight, generated by the flight muscles.
  - Drag: Acting in the opposite direction of flight, due to air resistance.
2. Get the children to cut out the bird body and wings from print outs and colour it in.
3. Fold the bird along the line and glue on the wings. Make sure the wings stick out horizontally. You now have a paper plane!
4. Now, try and make the bird fly! How far does it go?
5. Try throwing the bird with more or less force from your shoulder. How far does it go? This simulates thrust - the more force coming from the flight muscles, the further the bird can fly.
6. The models we have created are very streamlined, meaning that they generate very little drag. Birds are streamlined to minimise drag. Front-on, birds have a very small surface area; particularly the tip of the beak. This decreases air resistance.

## How can we show the learning?

- Extension: Let children experiment with changing conditions on how they throw their bird into flight:
  - Bend the wings down so the whole bird is vertically flat. Now try and make it fly. It doesn't go very far at all.
  - This is because lift acts upwards on the wings, so we need a large wing surface area to generate enough lift for flight.
  - Now, tape a penny to the bottom of each leg on the bird. The bird flies less far.
  - This is because its weight has increased, making it travel downwards more quickly.
- Ask children to repeat the four forces that act on a bird in flight. How did you simulate them today?
- What directions do those four forces act in?
- How did you change your throw to make the bird fly better? Under which conditions did the bird fly best?
- Challenge children to think of some ways in which birds they can name are adapted to maximise their flight ability using these forces.
- This activity can be linked to physics learning about forces.



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Make the bird fly!

