



SSC DIVE IN!

AUTUMN





WELCOME!

Hello, and welcome to “SSC Dive In!” - packs of resources providing seaside fun directly into family homes and classrooms.

This pack's theme: **Autumn**

Now summer is over and temperatures are starting to drop, it's time for birds to start preparing for the winter months ahead. Some stay in the country and make do with the cold, whilst others travel, or 'migrate', to warmer countries. Each year, Scotland sees millions of birds coming and going over Autumn. But what does migration involve? Why do birds do it? How do they do it? Answers revealed, plus fun activities inside!

Inside this pack:

- Children's Blog: On the Move
- Discover: Migration
- Puzzle: Migration Maze
- How to: Beginner's Guide to Birdwatching
- Spotter sheet: Autumn Shorebirds
- Experiment: Aerodynamics
- Craft instructions: Easy Bird Kite

Important note: If you are going outdoors, please follow the social distancing protocols and government advice.

We'd love to hear from you! If you've had fun having a go at activities, experiments and crafts, let us know. Any comments or pictures can be sent to marineengagement@seabird.org. More resources available on our [website](#).

Enjoy using our packs and want to see more? The Scottish Seabird Centre is an environmental education and conservation charity. Every penny we raise helps us deliver our important education and conservation work. If you enjoy using our resources and would like to support our work, please consider making a donation to the our [JustGiving page](#). Thank you.

We hope you enjoy diving in to the pack!

Scottish Seabird Centre Learning Team





BLOG

ON THE MOVE

Have you ever noticed the seasons changing? As the summer fades into autumn, it's not just the leaves falling from the trees which are on the move. Millions of animals migrate every year, heading for warmer places or plentiful feeding grounds as the weather shifts.

Sometimes these epic journeys bring animals together. American Bison have been known to migrate in herds of up to 4 million, stomping their way to greener pastures in unison as the seasons change. Smaller animals like red crabs (found on Easter Island off the coast of Chile) also move in huge groups. They have been known to block roads and footpaths, their vast numbers keep them safe from predators and increasing their chances of going the distance.



AMERICAN BISON

But not all migrating animals are stomping or scuttling towards their destination. In fact, many of the world's most spectacular journeys are undertaken high in the sky or under the water. From marlin to salmon, the sea is alive with long distance athletes. Each species of whale follows its own migratory route, usually feeding in the cold waters of the Arctic or Antarctic during the summer and heading for warmer waters during the winter. A grey whale calf migrates with its mother, and studies show it may have travelled a whopping 100,000 miles by the time it reaches maturity at around 12 years old. That's 2 and a half times around the world before it's even left 'home'! Even some species of lobster migrate, tip-tapping their way to warmer waters when the temperature drops in the winter.

Look to the sky's and you might catch a glimpse of some of the lesser-known migrations which happen around the globe each year. Species of butterfly, beetle and bat alike have all been known to make amazing journeys, sometimes even crossing dangerous seas and deserts to reach their destination.



Birds are master migrators too. At school, you might have heard about the migration of the swallow, swooping its way to Africa in the winter before returning to Scotland during the Spring to breed. However, the gold medal for a marathon migration (not just for birds but for all animals) actually goes to a small seabird which you might be lucky enough to spot feeding in the shallows during the Scottish summer. The amazing Arctic tern travels gigantic distances of between 44,000 and 59,000 miles each year. Over a lifetime, that means an arctic tern can fly the same distance as three round trips to the moon.

By August, most of the puffins around Scotland have begun to disappear from the coast, heading out into the Atlantic for the winter to feed. The gannets stick around a little longer, but most have left their breeding colonies by early October, the young gannets making the dangerous migration south for the first time. Many other seabirds are also on the move, following the fish and the milder weather away from Scotland.

ARCTIC TERN



© Greg Macvean

ATLANTIC PUFFIN



However, although Autumn in Scotland sees many animals leaving for the winter months, a whole host of wonderful winter species are arriving too. Geese can be seen flying in their thousands, their iconic V shaped traveling formation difficult to miss as they honk across the sky. Smaller birds like knot also make enormous journeys from the Arctic circle (up to 3,400 miles away) to boost the numbers of resident birds around the Scottish coast.

All of this amazing migratory activity makes autumn a great time to go bird-watching, both by the sea and further inland. Keep an eye out for returning wading birds like turnstones and redshank, and watch the last of the gannets fledge, feed and fly away. Remember to wish them luck as they go! They've got a long journey ahead.

ARE YOU A MIGRATION MASTERMIND?

Find out how much you've learnt by answering the following questions:

1. How many miles might a grey whale calf have travelled by the time it reaches maturity?
2. Which animal holds the record for the longest migration on earth?
3. What birds might you spot arriving in Scotland in winter?





DISCOVER

BIRD MIGRATION

WHAT IS MIGRATION?

The movement of animals from one place to another with the changing seasons.

WHY DOES IT HAPPEN?

As seasons change, so does the weather and amount of food available for birds to eat. Birds can either stay and cope with the change, or '**migrate**' to find more food and better conditions.



In autumn, the **Northern hemisphere** (the top half of the Earth) starts to experience shorter days and colder temperatures. This makes the environment **less productive** — there is less energy from the sun for plants to grow and animals to survive. To avoid these conditions, some species migrate South for the winter. Some stay in the same country, whilst others travel to the other side of the world! After winter has passed, the same

HOW DO BIRDS KNOW WHEN IT'S TIME TO MIGRATE?

The gradual change in the length of day in autumn triggers glands in the birds bodies to release special chemicals, called **hormones**. The hormones make the birds behave differently—they become restless, gather in flocks, and eat more food. Some species also **moult** their feathers, growing new ones for the journey. Once their bodies are ready, the birds wait for a period of calm weather then off they go!

HOW DO BIRDS PREPARE FOR THE JOURNEY?

Eat, eat, and eat! Migration takes a lot of energy, so birds need a store a lot of fat to fuel them on their journeys. The hormones in the birds bodies make them go into a feeding frenzy, causing them to spend all the time they can eating and building up their fat reserves.





DISCOVER

BIRD MIGRATION (CONTINUED)

HOW DO BIRDS KNOW WHERE TO GO?

Some learn from their parents, whilst others navigate all by themselves. Scientists are still finding out how they do this. Theories include:

- Using landmarks, such as mountains, rivers and coastlines.
- Using the position of the sun and stars.
- Detecting changes in the earth's magnetic field (the closer to the equator, the stronger the magnetic field).



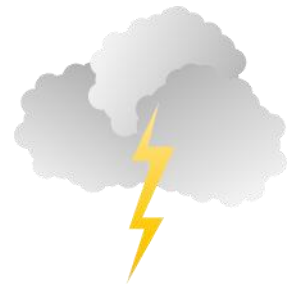
HOW DO SCIENTISTS STUDY BIRD MIGRATION?

'Ringing' - the process of attaching a small ring around the leg of a bird with a unique code on it. Birdwatchers report rings when they spot them, allowing researchers to see where birds have travelled.

'Geolocators' - tiny electronic devices attached to the backs of birds that detect where the bird travels and stores its route (a bit like a GPS).

WHAT HAZARDS DO BIRDS FACE DURING MIGRATION?

- Bad weather and storms might blow them off course.
- They may collide with wind turbines and other tall objects.
- They could fall prey to predators.
- They could run out of energy.



DID YOU KNOW...

Geese travel in a 'V' formation to save energy. In fact, scientists have shown that birds in V formation can fly **70%** further than one bird flying alone! This is because the geese at the front change the flow of air so individuals at the back don't have to work as hard. The geese then take it in turns to be in the more tiring position at the front. Now that's team work!



© Dora Roden



DISCOVER

SEABIRD MIGRATION—WHO GOES WHERE?

Most seabirds in the UK are summer visitors—they breed and raise their young between May–October then leave for the winter. But where do they go?

Below are a few examples of the extraordinary journeys seabirds make from the Firth of Forth, Scotland.



© Phil Wilkinson

ATLANTIC PUFFIN

Puffins leave their UK summer breeding grounds in August and travel to the middle of the North Atlantic and Arctic Ocean for the winter. They stay on the open ocean, floating on the sea in groups called '**rafts**'. They return to their breeding colonies in March/early April.

NORTHERN GANNET



© Rob McDougall

By the end of October, all the gannets have left Scotland for their migration South. Some individuals travel as far South as the West coast of Africa, spending their time at sea until it's time for them to return to the UK in February.

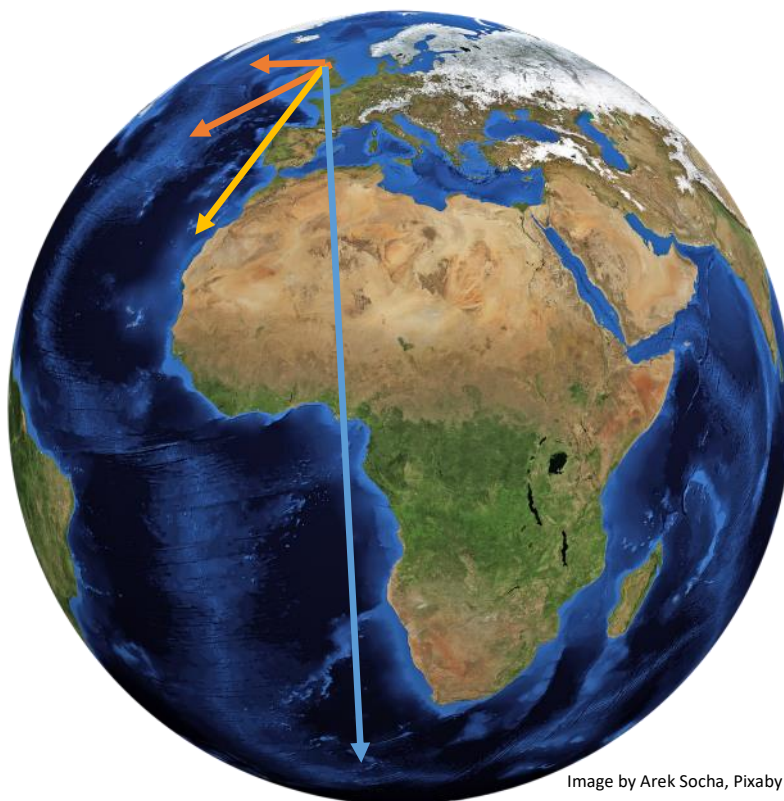


Image by Arek Socha, Pixaby



© Greg Macvean

ARCTIC TERN

Believe it or not, this little bird undertakes the longest migration on the planet. Some individuals travel from the Arctic to the Antarctic and back again in one year. That's between 44,000 and 59,000 miles each year—the same distance as flying to the moon and back three times over its lifetime!

Those that breed in Scotland leave in August and arrive back in May.

PUZZLE

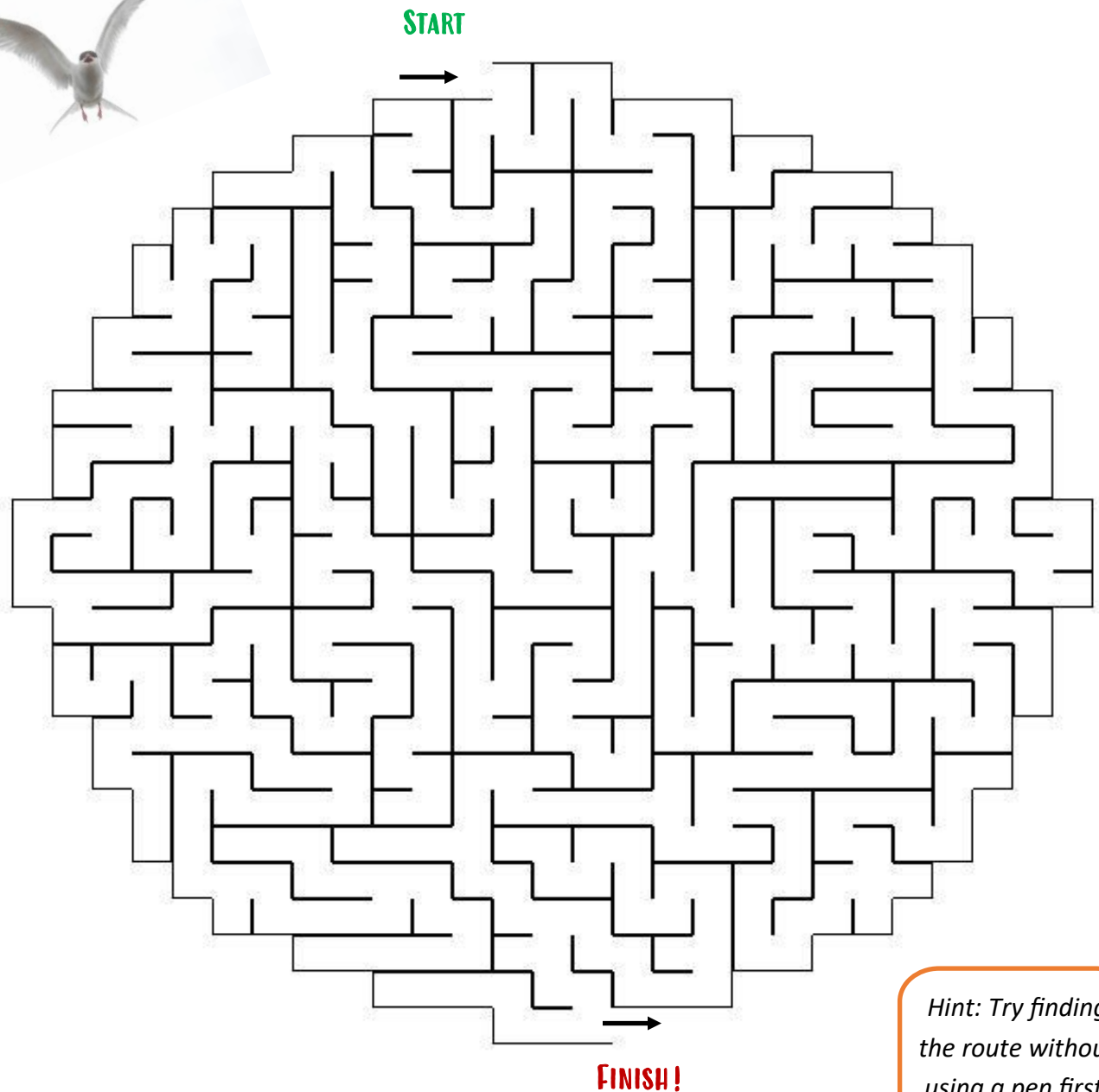


MIGRATION MAZE

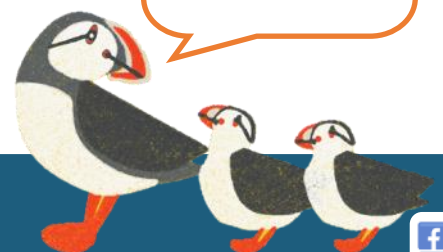
Can you help this arctic tern reach its winter home? Find the right route through the maze to complete the migration.



© Greg Macvean



Hint: Try finding the route without using a pen first.



HOW TO..



GETTING STARTED WITH BIRDWATCHING

If you're looking for a hobby that connects you with nature, can be done almost anywhere and at low cost – look no further. Birdwatching could be just the activity for you! Your own eyes and ears and a perhaps a bit of patience are all you need to get started.



Bird life in Scotland is abundant and diverse. From garden birds to huge predators, seabird colonies to birds of the moors and mountains. Yet you don't need to travel far (or even leave the house) to be able to see a range of birds. Look out the window and take note of what you spot. Aim to build up knowledge of your local species first. Learn their distinguishing marks, size, shape and colours (remembering that males, females and juveniles of a same species can look different). Pay attention to the main parts of the bird—what colour is its beak, how long are its legs, what do you notice about its wings or its tail?

Note down everything that you see (and hear—each bird has a unique range of calls). Perhaps try to sketch the bird. Now you are ready to cross-refer what you have spotted with an identification guide. This could be a book, ID sheet, app or on-line resource. Some examples of resources are given below. As you see each bird over time take note of how it looks when flying as well as when perched or on the ground. Pay attention to its behaviours – is it feeding, singing, preening, gathering nest material or putting on a mating display? Start to notice changes over the seasons, as species come and go or change in appearance. You might be fortunate enough to spot unusual visitors or birds passing through on a migration journey.

WHAT WILL I NEED?

- ✓ Notebook and pen
- ✓ Bird ID Guide
- ✓ Binoculars
- ✓ Patience



Once you can identify all the birds close to your home, you may want to look further afield (travel restrictions permitting) such as a nearby wood, park, beach or other outdoor space. Take your notebook with you, a guidebook if you have one and consider getting a set of binoculars. These will help you see birds in greater detail, aiding identification. Taking photographs with a camera or phone can also enhance the experience and help create a visual record of your sightings.

Always be respectful towards wildlife and their habitats. Leave nothing behind—no litter. Plus at present we all need to avoid excessive travel, need to be aware of others, maintaining physical distancing and wearing a face covering where required to do so. We all have a responsibility to ensure that both the wildlife and the people connecting with it stay safe. The good news is that birdwatching is not a pastime to be rushed. Start local and build slowly from there. It's a hobby that can last a lifetime! Why not start your birdwatching journey today?



HOW DO I BIRDWATCH RESPONSIBLY?

- ✓ Respect wildlife
- ✓ Stay local
- ✓ Keep a safe distance
- ✓ Leave no trace

FURTHER RESOURCES

The SOC's 'Where to watch birds in Scotland' free mobile app - <https://www.the-soc.org.uk/about-us/app>

The RSPB's Bird A-Z - <https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/>

BTO on-line resources - <https://www.bto.org/develop-your-skills/bird-identification>

FSC guides - <https://www.field-studies-council.org/product-category/publications/>





SPOTTER SHEET

AUTUMN SHOREBIRDS

This guide identifies some of the birds that you might see on the coast around the Firth of Forth in the autumn. Use the circles provided to tally how many you've seen!

CURLEW

Numenius arquata



Curlews have mottled brown plumage and long downcurved bills which act like tweezers, helping them eat worms, insects, molluscs and crabs.

BAR-TAILED GODWIT

Limosa lapponica



With a straighter bill than the Curlew, the Godwit enjoys sand and mudflats where it can probe for food. Look for the pinkish bill base with dark tip.

PINK-FOOTED GOOSE

Anser fabalis



Pink-footed geese pass through Scotland in large numbers in autumn, coming from Iceland and Greenland on their way farther south.

LAPWING

Vanellus vanellus



A black cap extending into an impressive crest makes the Lapwing distinctive. It also has a short dark bill, white chest and pinkish short legs.

LITTLE EGRET

Egretta garzetta



With the appearance of a white heron, the Little Egret has a long neck, black bill, black legs and yellow feet.

OYSTERCATCHER

Haematopus ostralegus



An eye-catching orange-red bill makes the Oystercatcher quite easy to spot. It has a stocky black and white body, pink legs and a red eye.

TURNSTONE

Arenaria interpres



Smaller than a Redshank, the Turnstone has a dark mottled back and breast with a white underside. At home on rocks or sandy beaches.

REDSHANK

Tringa totanus

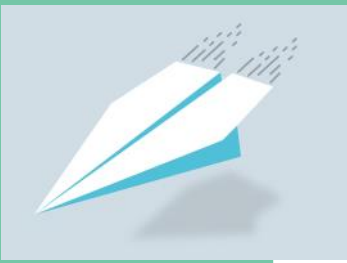


A Redshank has a straight bill that is red at the base and black at the tip. Its lengthy red legs give it its name. Listen for its loud ringing calls.



If you have enjoyed using our resources, please consider making a donation to the Scottish Seabird Centre. To find out more about the charity or to donate online, visit our [WEBSITE](https://www.seabird.org).

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EXPERIMENT

AERODYNAMICS



QUESTION: HOW DO BIRDS FLY?

Birds make it look so easy, but no matter how hard we flap our arms we will never fly. Why?

It's all to do with the shape of birds bodies and physics!

TEST

A test to see what shape makes a paper aeroplane travel the furthest.

WHAT DO I NEED?

- Paper
- Paper airplane instructions
- Results table
- Tape measure (optional)

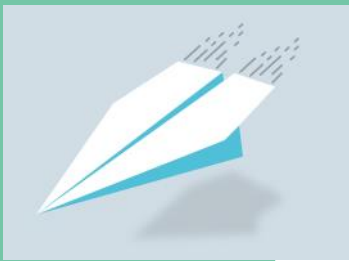
- 1 Select 3 paper airplane designs that you want to test. You can design your own or look for design ideas online.
- 2 Construct 1 paper airplane for each design. You can even decorate them or give them a name!
- 3 Stretch out your tape measure if you have one, or have something at the ready to indicate where each plane lands (any object will do).
- 4 Stand in the same place (the beginning of the tape measure if you have one) and throw each plane, one at a time. Record how far they travel by measuring the distance or noting the position of each plane, e.g. 1st, 2nd and 3rd (1st should be for the plane that travels the furthest distance). Record each result in the table (next page), then repeat 2 more times.
- 5 Complete the results table and work out the winner! After three tries, the plane that travels the largest average distance or wins the most is the champion.

ANSWER: AERODYNAMICS

'**Aerodynamics**' is the study of how objects move through air. Birds have the perfect mix of a light body, strong wings, and a '**streamlined**' body (a shape that moves easily through air or water). Plane wings are a similar shape to bird wings—see the 'The Science of Flight' page to discover why!

Different birds fly in different ways—some soar, whilst others flap continuously. Wings therefore come in different shapes and sizes to match the job they need to do.

Paper airplane wings don't flap, so the plane that travels the furthest is the one able to soar the longest.



EXPERIMENT

AERODYNAMICS

TABLE OF RESULTS

Enter how far each plane travelled after each test in the table below. If distance can't be measured, write the position of each plane (1st, 2nd, 3rd) after each test is complete.

	Test 1	Test 2	Test 3	Average distance (optional)
Plane 1 Distance or position				
Plane 2 Distance or position				
Plane 3 Distance or position				

To work out the average distance for each plane, do the following sums (or skip to the final result):

- 1 Distance 1 + Distance 2 + Distance 3 = total distance travelled.
- 2 Total distance travelled \div 3 = average distance.

Remember to include
units of measurement
when writing results,
e.g. metres (m).



FINAL RESULT

After 3 tests, the plane that travelled the largest
average distance, or came first the most, was: _____





DISCOVER

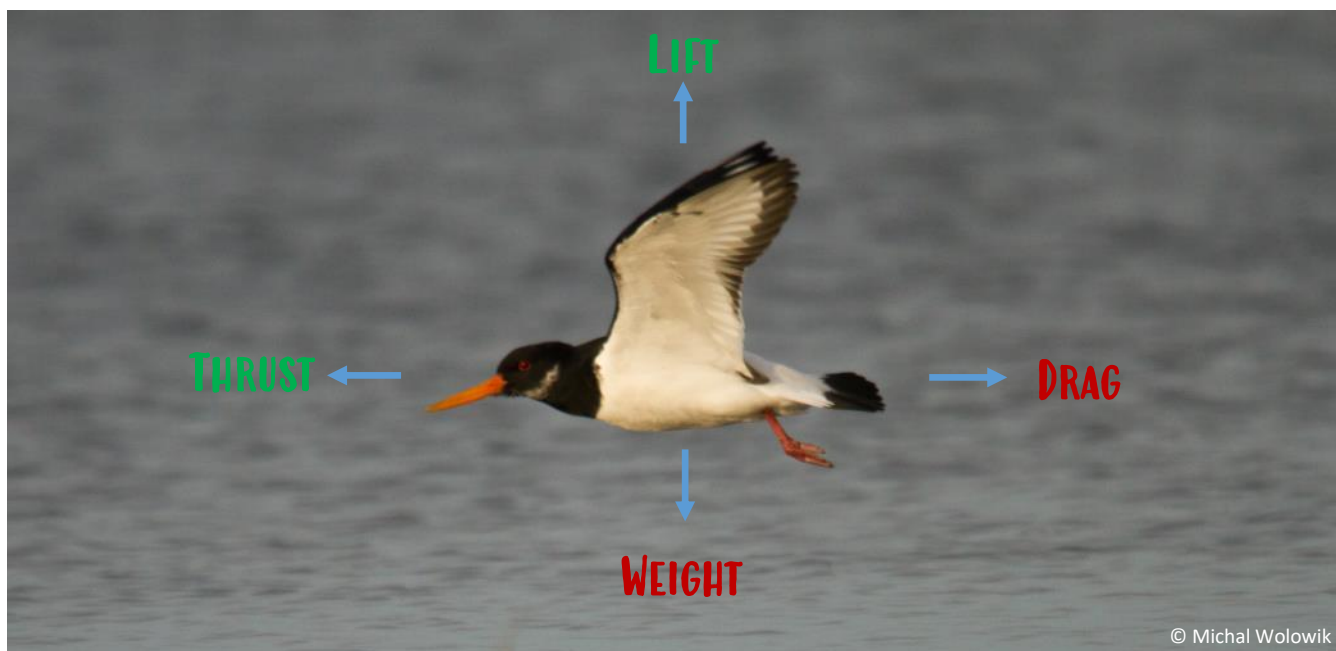
THE SCIENCE OF FLIGHT

When birds fly, their bodies experience 4 **forces**.

A force is something that causes a change in the speed or direction of an object. Forces can be a “**push**” or “**pull**”.

To fly, birds need to get the right mix of forces:

1. **Weight** – the force that pulls the bird towards the ground. To balance their weight, birds must generate ‘Lift’.
2. **Lift** – the force that pushes the birds up, away from the ground. Lift is made by the shape of the wings.
3. **Drag** – the force that pulls the bird back as it flies and slows it down. To combat drag, birds need to generate ‘Thrust’.
4. **Thrust** – the force that pushes the birds through the air. Thrust is generated when a bird flaps its wings.



DID YOU KNOW...

- A bird wing is described as an ‘**aerofoil**’ - something that is shaped in a certain way that allows the air to flow underneath it so it pushes the object up.
- Airplane wings are also aerofoils! The next time you’re in a plane, look out the window and imagine the air flowing underneath the wing, generating the lift that’s keeping you in the air.



CRAFT

EASY BIRD KITE



WHAT DO I NEED?

- Coloured paper (A4 size works best)
- Scissors
- Glue
- Stapler
- A pen
- String
- Hole punch
- Feathers (optional)

1



Choose a piece of coloured A4 paper and create a crease lengthways.

Using different coloured paper, cut out a beak and some tail feathers.

2



Fold your piece of A4 coloured paper in half lengthways. Then take the top corner and bring it down to the folded edge. Repeat on other side and staple into position.

3



Glue the beak into the fold at the narrow end and glue the tail feathers into the fold at the other end. Draw on an eye close to the beak.

4



With the hole punch, make a hole at the centre of the body fold. Tie a long piece of string through the hole.



CRAFT

EASY BIRD KITE

If you enjoyed making your bird kite, why not make a whole flock!

You can experiment with size, colour, pattern, beak style and eye shape! Try using some real feathers instead of paper ones.

TOP TIP: You can reinforce the punched hole with Sellotape to make it stronger.



We'd love to see your fantastic pieces of art and experiment results! Share them with the team by sending them to:

marineengagement@seabird.org

