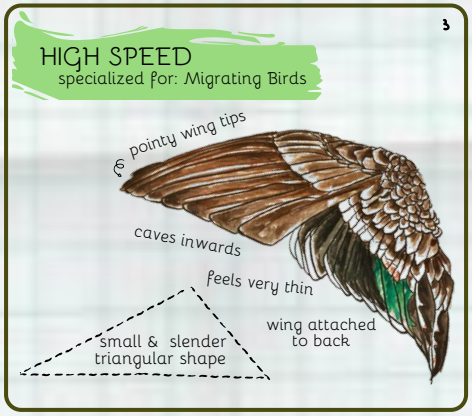
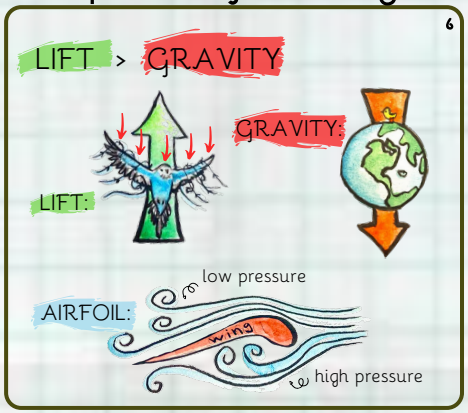
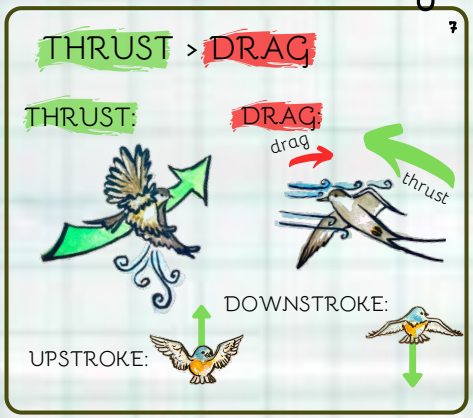

THE BIRD SCHOOL
PROJECT
WINGS!
Designed by: Julia Cheng

Table of Contents:







ACTIVE SOARING

specialized for: Sea Birds

long & narrow
rectangular shape

flight pattern:

super light & thin

wing tip area smaller than wing length

circling behavior helps birds find food

OCEAN BREEZE:

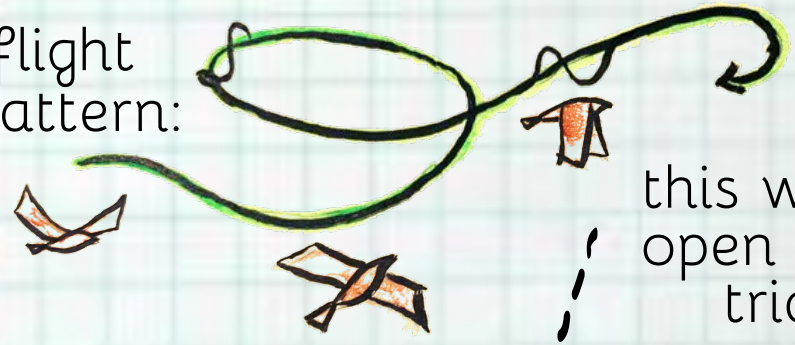
Soaring birds have wings that cut through wind easliy.

PASSIVE SOARING

specialized for: Birds of Prey

broad & wide rectangular shape

flight pattern:



this wing is half open so it looks triangular

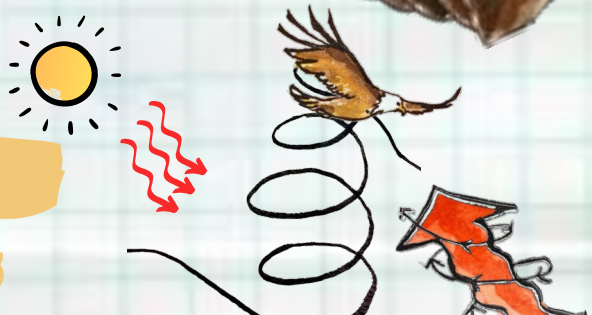
long primaries

Turkey vultures have a special dihedral wing shape.

large wing slots

THERMALS:

Columns of hot, rising air created by uneven heating from the Sun.



ELLIPTICAL

specialized for: Forest + Scrub Dwelling Birds

small & round
egg shape

flight
pattern:

the "songbird rollercoaster"

rounded
wing tips

short wing span

RAPID TAKE-OFF:

A short wing span allows these birds to lift off quickly. This wing type is great for moving through trees.

wing slots similar
to passive soaring

super light weight

BUSH HOPPING:

HIGH SPEED

specialized for: Migrating Birds

small & slender triangular shape

flight pattern:

pointy wing tips

caves inwards

NEED FOR SPEED:

Triangular wings allows birds fly fast for long distances. This is perfect for migrating species. These birds have adapted to eat and drink on the wing!!

feels very thin

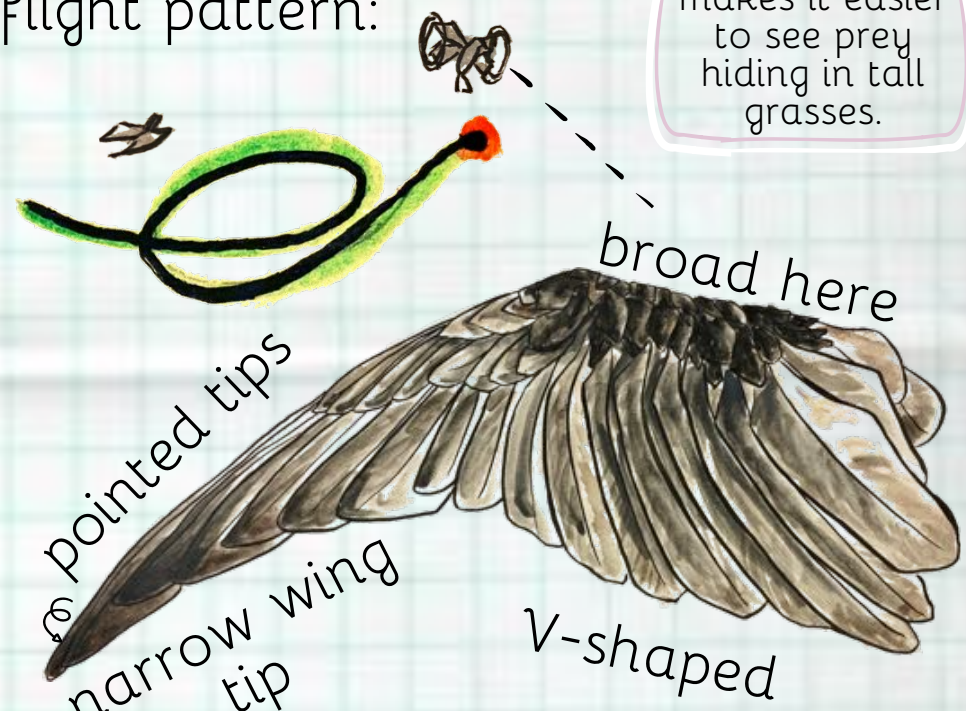
wing attached to back

Ducks and pigeons flap constantly to fly fast and straight.

HOVERING
specialized for: Open Air Hunters

Raptors

flight pattern:



Hovering makes it easier to see prey hiding in tall grasses.

Headwind means wind blowing in opposite direction

HEADWIND:

Certain birds can hover for a short period of time using headwind.

HUMMINGBIRDs:

flight pattern:

With just a twist of their wing, they can change direction mid-flight.

Hummingbirds beat their wings in a figure eight pattern.

tiny, paddle-like

They can beat their wings from 8-200 times per second!!!

AIR ACROBATS:

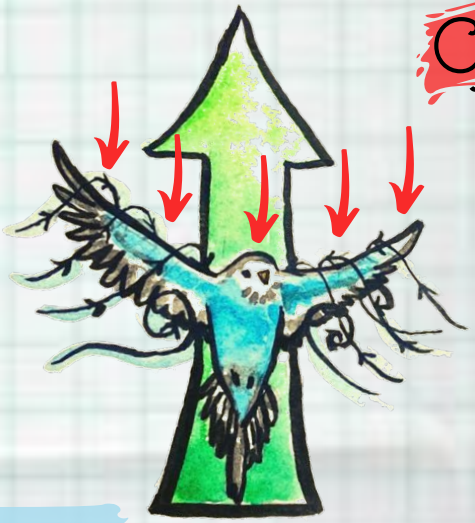
Hummingbirds are the only birds that can fly forward, backward, sideways, and straight up.

4 FORCES OF FLIGHT

LIFT > GRAVITY *Lift must be greater than gravity for flight*

LIFT:

Lift pushes up against gravity allowing a bird to fly.



GRAVITY:

Gravity is a downward force that pulls everything towards the center of Earth.

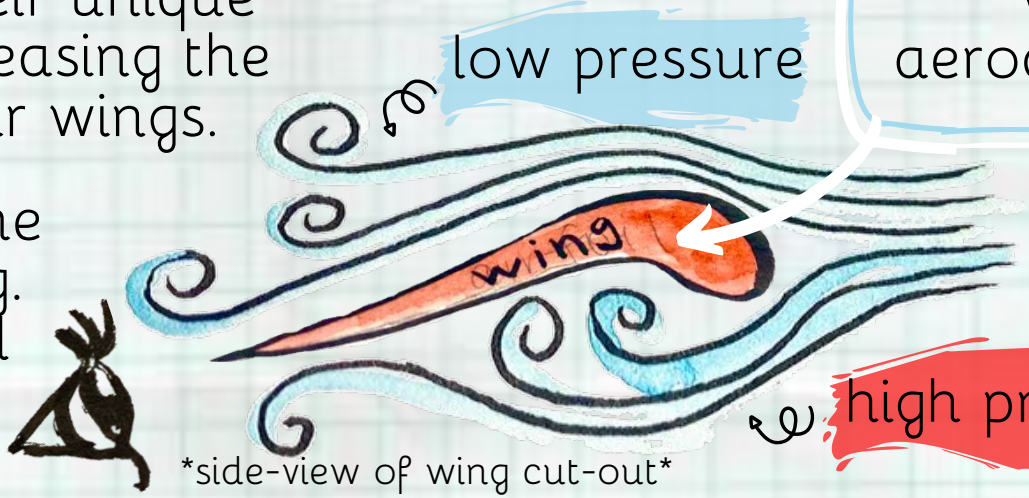
HOW DO WINGS WORK?

Wings are an airfoil. Their unique shape creates lift by increasing the air pressure beneath their wings.

Air slows down under the curved area of the wing. This creates an upward force called lift.

AIRFOIL:

a teardrop shape that is very aerodynamic



side-view of wing cut-out

4 FORCES OF FLIGHT

THRUST > DRAG *Lift must be greater than gravity for forward flight*

THRUST:

Force created when air from flapping is pushed down and back. Thrust propels the bird forward

DRAG:

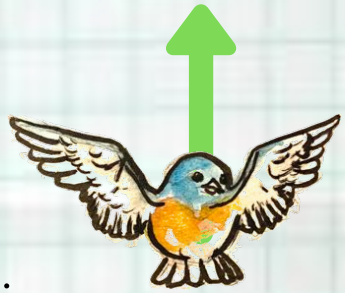
Friction from the air that slows the bird down.

A bird's streamlined body reduces drag.

HOW DOES FLAPPING WORK?

UPSTROKE:

Wings are partially folded. Primary feathers are twisted back to minimize drag.



DOWNSTROKE:

Wings are fully open. The front part of the wing is twisted down to create thrust.