How Come How So?

THAT'S HOW THINGS TRAVEL

the wonderful ways in which the world moves

Terrapin

A note from Dr R K Pachauri

Human society has reached a stage of prosperity, which was not expected several decades ago. Yet, we have a large number of people living in poverty and barely able to keep alive. It appears that they have not been touched by human progress at all. At the same time, what we regard as progress has resulted in damage and destruction of our natural resources and caused serious problems such as human-induced climate change, which threatens all forms of life in the form of sea-level rise, heatwaves, floods, droughts, and melting of glaciers in different parts of the world.

All of this provides a strong reason for us to change the way we have been pursuing human activities and what we have mistakenly believed as human progress. For instance, we must now use renewable sources of energy, eco-friendly methods of production and consumption, make efficient use of water in every activity, and protect biodiversity.

It is in the hands of the children to try to change their own lives towards greater protection of the environment and all our natural resources. They can also take active part in changing the thinking of adults. Children can take a lead in organizing actions at the community level, which support conservation of resources, recycling of waste water, and greater use of renewable sources of energy.

This series of children's books is aimed of providing children knowledge on what needs to be done in all these areas. I hope those who read these books will not only enjoy them greatly but also feel inspired to implement actions that are described in these pages, so that we create a beautiful, peaceful, and healthy future for the human race.

R K Pachauri
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How does a glider fly?

Wouldn't it be fun to fly like a bird? Alas, we humans don't have wings. The closest we can get to flying like a bird is flying on a glider.

Silent sailplane

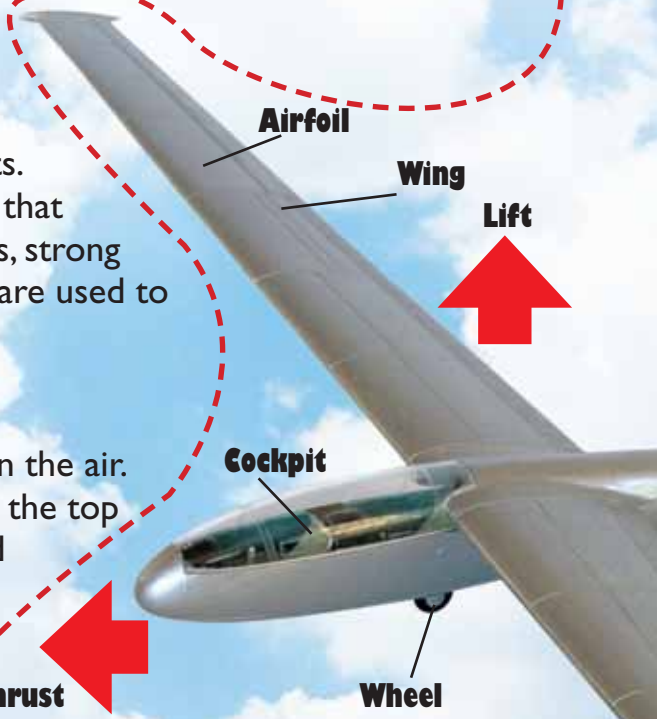
A glider has no engine. It is powered only by the forces of gravity and air currents. It moves silently through the sky, like a sailboat on water. This is why gliders are also called sailplanes.

A glider is simply a wing built around a cockpit that can hold one or two pilots. Gliders are made as light as possible, so that they can stay in the air longer. Nowadays, strong and lightweight materials, like fibreglass, are used to make gliders.

Shaped to fly

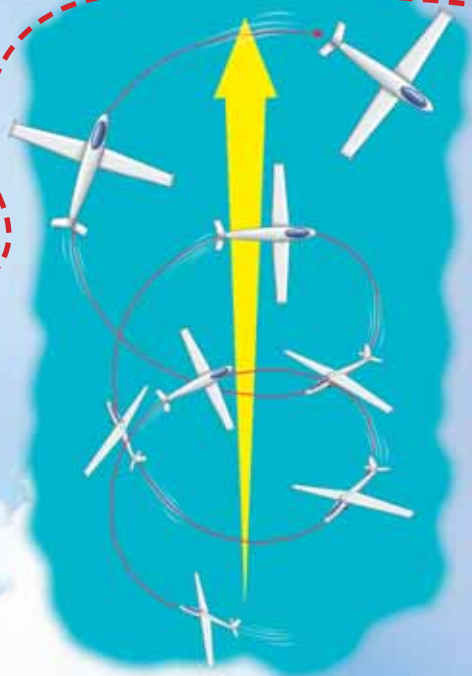
A glider must overcome gravity to stay in the air. To do this, the glider's wing is curved on the top and flat on the bottom. This shape, called "airfoil", creates an upward force called "lift" on the wing as it moves through the air. This makes the glider float on air.

The glider's wing is also very long and narrow. This shape helps it stay afloat. To understand how this happens, roll a piece of paper into a ball and drop it. It will fall. Now spread the paper out and drop it again. Just like the glider, the paper will float for a while.



Gliders have no engines and can be thought of as simple flying vehicles, staying in the air by balancing the forces of gravity, lift, drag, and thrust.

A glider lands like a normal plane except that it has only one landing wheel.

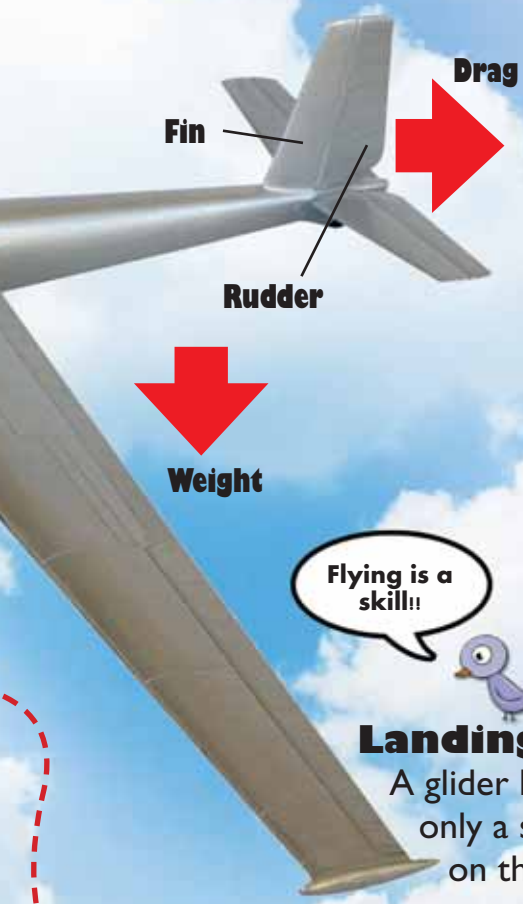


Once a glider pilot locates a thermal, he circles inside it, till he reaches the desired altitude. Once there, he exits the thermal and continues on his flight.

A conventional plane is used to tow the glider up into the sky using a rope. This helps it get off and up to an altitude.

Soaring on thermals

The glider pilot looks for a rising warm column of air, called "thermal", on which the glider can stay afloat. Thermals are found above patches of ground that absorb lots of sunlight and heat up the air above them – like concrete parking lots, rocky terrain, and ploughed fields. If the glider pilot finds a thermal, he can keep circling inside it like an eagle, sometimes for several hours!



Getting a lift

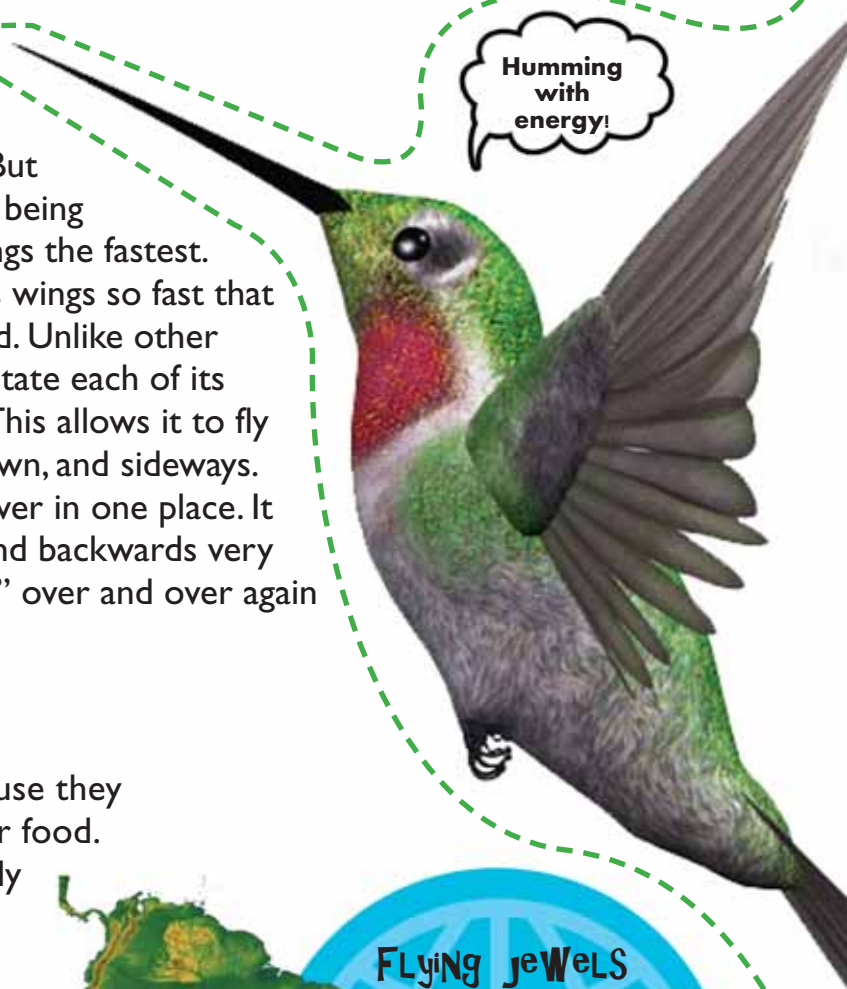
Without an engine, a glider cannot lift itself off the ground. So, the glider is first towed up into the sky by a powered aeroplane using a long rope. Once airborne, the glider pilot detaches the rope and soars like a bird!

Landing

A glider lands just like a normal plane. Usually, there's only a single small wheel under the cockpit, which rolls on the ground once the glider lands. The wing-tips are made very strong to prevent damage in case they scrape on the ground while landing.

How does a hummingbird fly backwards?

Did you know that the world's smallest bird is also one of nature's most amazing flyers? Meet the hummingbird. There are many species of this little bird, most of them living in North and South America.



Wizard flyers

The hummingbird is very tiny; barely 3.5 inches long. But its size doesn't stop it from being the bird that can flap its wings the fastest. The hummingbird moves its wings so fast that they make a humming sound. Unlike other birds, a hummingbird can rotate each of its wings in a complete circle. This allows it to fly forwards, backwards, up, down, and sideways. A hummingbird can also hover in one place. It moves its wings forwards and backwards very quickly, tracing the figure "8" over and over again so that it stays in mid-air!

Fast food lovers!

Hummingbirds need their wonderful flying skills because they depend on flowers for their food. A hummingbird is constantly on the move, darting from flower to flower, sipping nectar and eating any small bugs that it finds inside them. It even pulls insects out of spider webs! It also snatches tiny insects, like gnats, mid-air!

Flying jewels

Hummingbirds aren't just wizards at flying; they also have the most beautiful colours. Early Spanish explorers to South America called them "joyas volardores", or the "flying jewels".

A hummingbird can move instantly in any direction from a standstill position. It can even fly upside down for a short distance!

Tiny insects are in danger of becoming a flying snack for a hummingbird.

Hummingbirds can fly at an average speed of 40–48 km per hour, and when they dive, they can even go as fast as 96 km per hour!

Feathery bundles of energy

Flying like a hummingbird requires a lot of energy and strength. About a third of a hummingbird's weight is made up of muscles. A hummingbird uses so much energy that it has to eat almost every ten minutes to stay alive. It may visit as many as a thousand flowers a day to get energy from their sugary nectar.

In winter, many species of hummingbirds fly southwards to warmer places. For instance, ruby-throated hummingbirds travel 3,200 km – from Canada to Panama – every winter. This includes a non-stop flight of 800 km over the Gulf of Mexico!

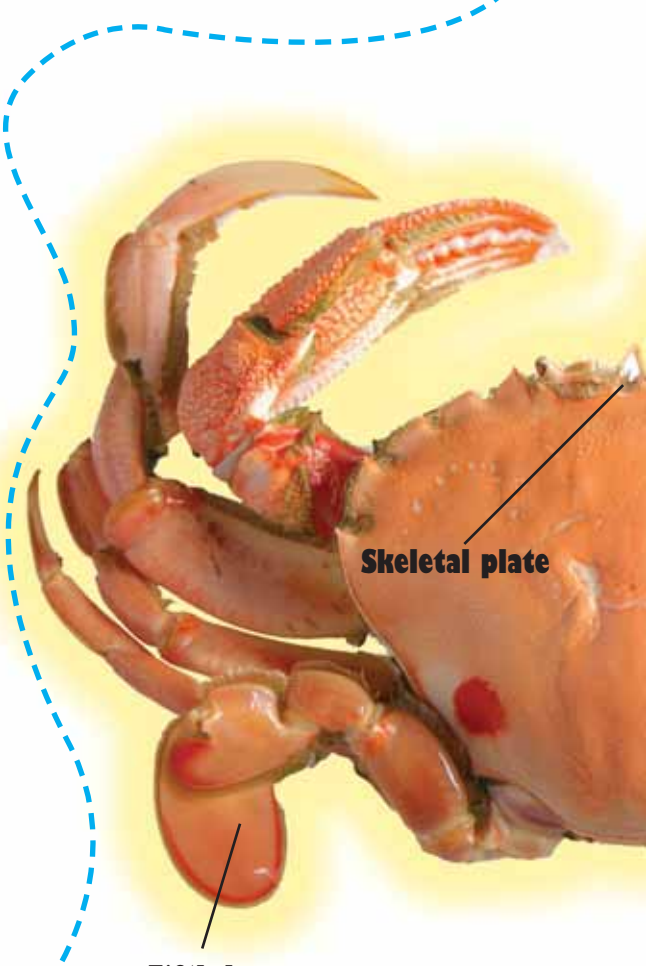
How does a crab walk sideways?

Have you ever seen a creature with eight legs, two large and very powerful claws, a hard shell from which two stalks stick out with eyes at their ends, and a strange habit of walking or running sideways? It's the crab, of course. Crabs are very common and can be found on the seashore and in the sea.

Why walk sideways?

Crabs' legs are bent in such a way that they can only walk sideways! The muscles in a crab's leg are attached to the inner surface of its hard shell, which is called exoskeleton. This allows the leg to bend and stretch only in one direction. Also, a crab's leg has many joints. These joints are not "ball-and-socket" joints like our shoulder and hip joints, which can move in all directions. Instead, they are "peg-in-socket" joints like our knees and finger joints. Such joints allow easy movement in only one plane. To understand what this means, flex your knee to move the portion of your leg below the knee. You'll find that you can easily move your lower leg forward and back. But it's very hard to move it from side to side.

The "peg-in-socket" joint, like the one found in the human knee, allows movement in only one plane.



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