9 The force of the air

Air can slow things down, but fast-moving air can also be an important lifting force.

Air is all around us, but we don't normally think about it as a force. This is because air is a 'thin' substance that is easily pushed out of the way as we walk about. But if an object moves quickly through the air, then the air does not move out of the way fast enough and so it acts as a force that holds back, or resists, that movement.

Parachute

A feather, or a parachute seed, drops slowly through the air because it is light and has a large area to trap the air (Picture 1).

You can see how a large area causes an object to fall more slowly, by making a parachute from a piece of paper, some cotton threads and a weight (Picture 2).

▼ **(Picture 1) Some seeds act as natural parachutes.**

◀▼ **(Picture 2) A parachute falls slowly because the large surface area traps the air, making it difficult for the air to flow out of the way. In this case the weight is always greater than the air resistance, so the parachute falls, no matter how big it is.**

Making air cause lift

We have seen how air can stop movement, but it can also be used to lift things off the ground. For example, a hovercraft works by forcing air at high

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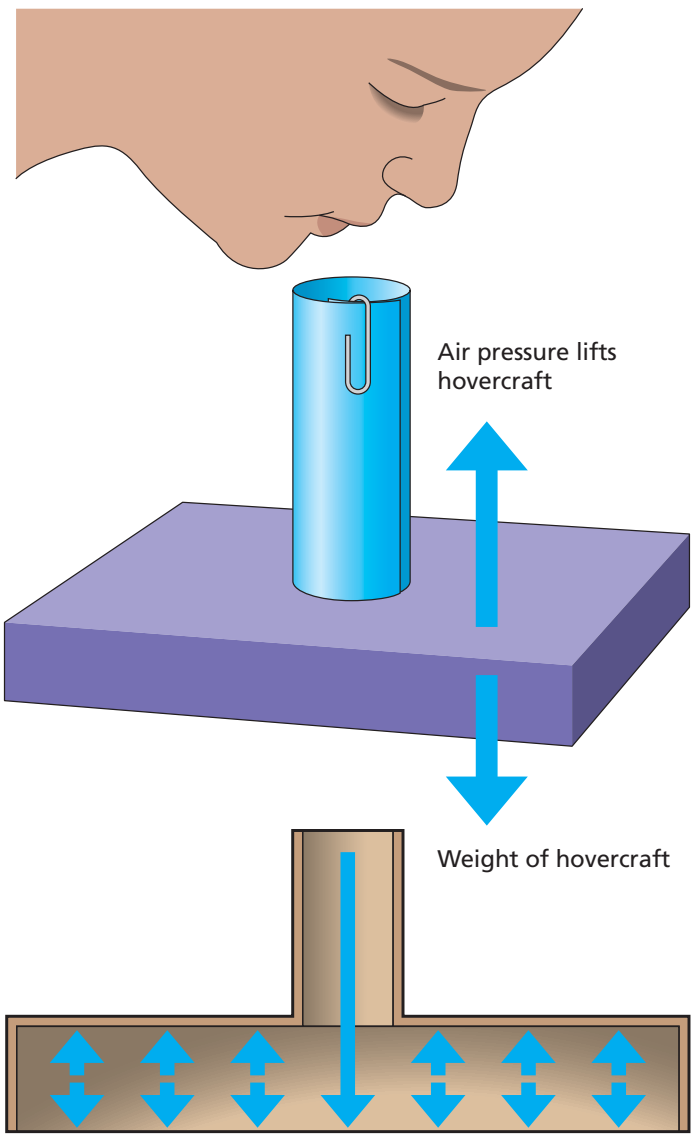
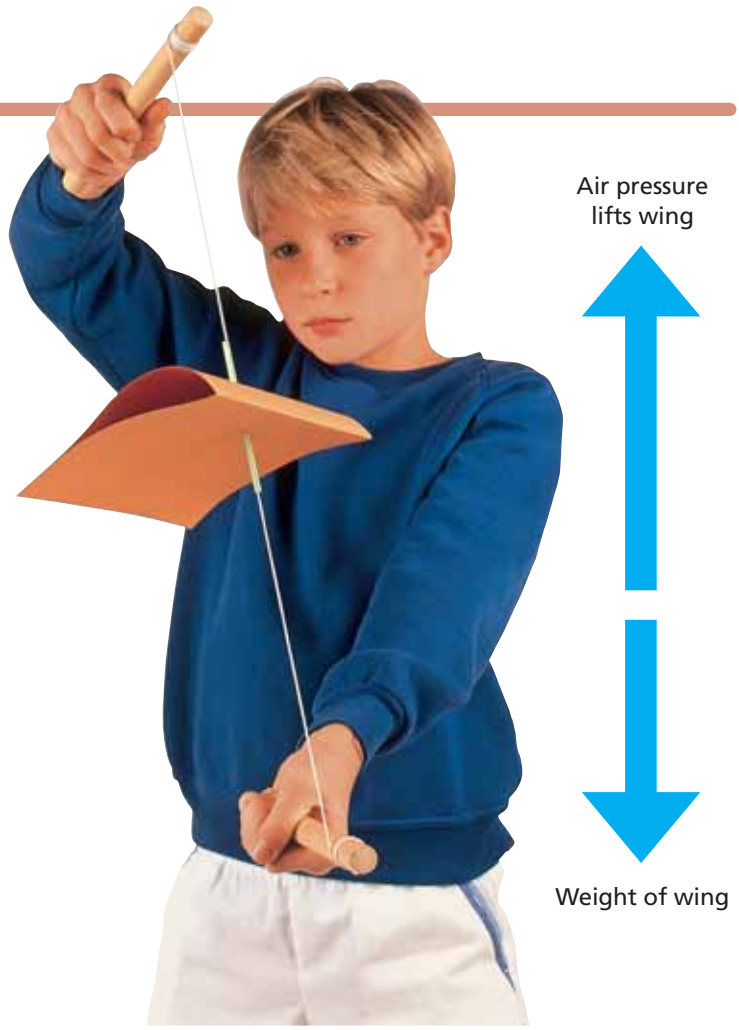
speed into a hollow space below the craft. The air gets squashed up and pushes against the ground and the craft (Picture 3). The air is used to hold the craft off the ground.

▼ **(Picture 3) You can show how hovercraft work by squashing up air. Simply glue a paper tube over a hole in a shoebox and blow. The hovercraft will lift up. In this case the force of the air pressure is greater than the weight of the shoebox lid.**





▲ **(Picture 4) You can show the lifting force of a wing by folding over a piece of paper and glueing it to make a wing. Thread it through a string and walk quickly forwards. The air will give lifting force. In this case, the lifting force is greater than the weight of the wing, so the wing moves.**

An aircraft also gets its lift from the air. It is pushed forward through the air at high speed by its engines. As it does so, the air builds up more pressure under the wing than above it. This gives an upward force we call lift or **LIFTING FORCE**. It is an easy thing to demonstrate (Picture 4).

Summary

- **Air becomes a force when it is squashed.**
- **Lifting force is a force that works when things move quickly through air.**