



*Air seems like nothing at all — but air is **real stuff**. It takes up space, it has weight, and it pushes on you from every side, right now.*

THE BIG IDEA

Anything that takes up space and has weight is **matter** — real stuff. Rocks are matter. Water is matter. And air passes both tests too, even though we can't see it. All the air together makes the **atmosphere**, an ocean of air wrapped around the whole Earth, held down by **gravity**. It gets thinner as you go up, until it runs out — and that is where space begins.

THREE PROOFS AIR IS REAL



IT TAKES UP SPACE — the upside-down glass stayed full of air, so the water could not get in and the paper stayed dry.



IT HAS WEIGHT — the balloon full of air pulled its side of the balance down. We even counted its weight in paper clips.



IT PUSHES FROM EVERY SIDE — when the air inside was gone, the air outside crushed a metal can flat. Nobody touched it.

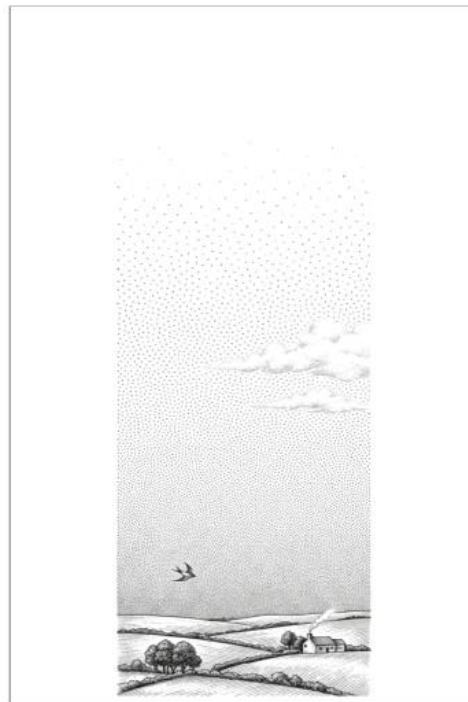


Fig. 1 — **the atmosphere**: you live at the bottom of an ocean of air. It thins as you climb — past the birds, the clouds, the jets — until space, where there is none.

WORDS TO KNOW

air

space

weight

pressure

vacuum

atmosphere

gravity

air — real stuff all around you that you can't see · **space** — the room something takes up · **weight** — how hard gravity pulls something down · **pressure** — air pushing on everything from every side · **vacuum** — a space with the air taken out · **atmosphere** — the ocean of air wrapped around Earth · **gravity** — the pull that holds everything down

WATCH FOR THIS IN EVERYDAY LIFE

- Playing in the bath, push a jar upside-down under the water. *Why won't the water go in?*
- Press a suction cup on the fridge and tug. *Nothing is inside it — so what is holding it on?*
- Squeeze a sealed bag of “nothing” or a pumped-up ball. *What is pushing back at you?*
- Your ears pop on a big hill or a long drive. *What just changed its push on your ears?*
- Feel the wind on your face. *What is bumping into you that you cannot see?*