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Turbojet or turbofan?

Two official NASA pages, kept on two sides of one sheet.

"A turbofan engine is the most modern variation of the basic gas turbine engine." "Most modern airliners use turbofan engines because of their high thrust and good fuel efficiency." The trick is a fan, and a stream of air that never enters the burner.

Turbojet	Turbofan
All the air, on the student page, "entering the intake passes through the gas generator."	Some air "passes through the fan and continues on into the core compressor and then into the burner." The rest "bypasses, or goes around the engine, just like the air through a propeller."
Thrust comes because "the exit velocity is greater than the free stream velocity."	"A turbofan generates more thrust for nearly the same amount of fuel used by the core."

A rocket, by contrast

NASA's gas-turbine page says a rocket must carry its oxygen. A turbine engine "gets its oxygen from the surrounding air" and "does not work in outer space because there is no surrounding air."

A short quiz

1. What does NASA liken the turbofan's bypass air to?
2. Why, according to NASA, does a turbofan make more thrust for nearly the same core fuel?
3. Why will a turbine engine not work in outer space?

Answers. 1. The air through a propeller. 2. Because some of the air bypasses the core, and the core fuel flow changes only a small amount. 3. Because there is no surrounding air.

Wording from NASA Glenn, "Turbojet Engines," "Turbofan Thrust," "Gas Turbine Propulsion," and the student "Engines" page. Checked 17 November 2026.
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