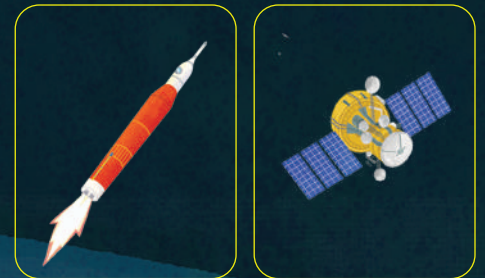# Earth's Atmosphere

## Exosphere

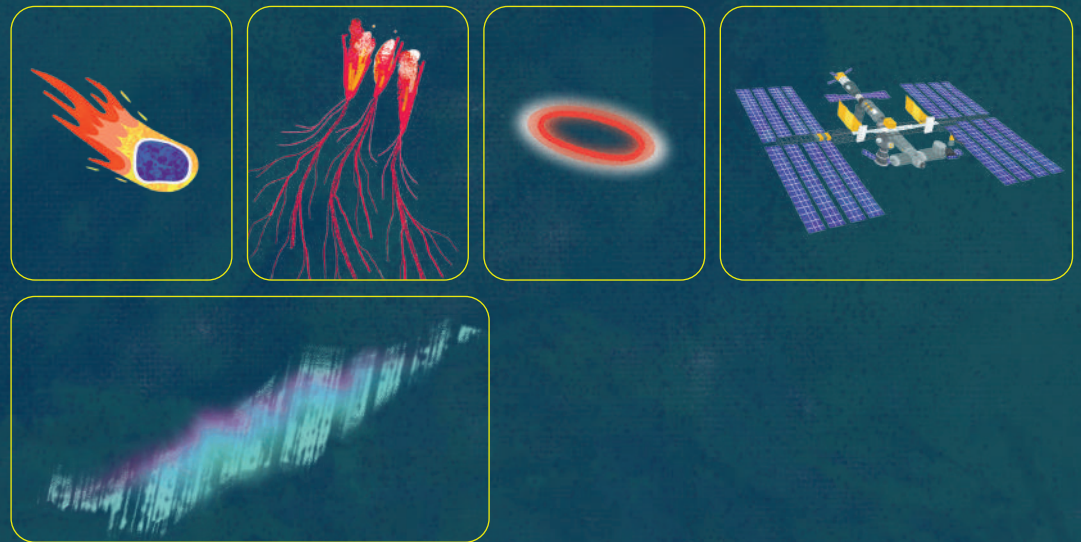**375 to 6,200 miles (600 to 10,000 km) above Earth's surface**

- Air is extremely thin, no oxygen
- Almost a perfect vacuum, meaning it's nearly empty
- This layer gradually fades away into outer space
- Temperature can't be measured, but ranges from extremely hot to extremely cold, depending on solar activity
- You'll see: High-Earth orbit satellites, spacecrafts, and space stations

## Thermosphere

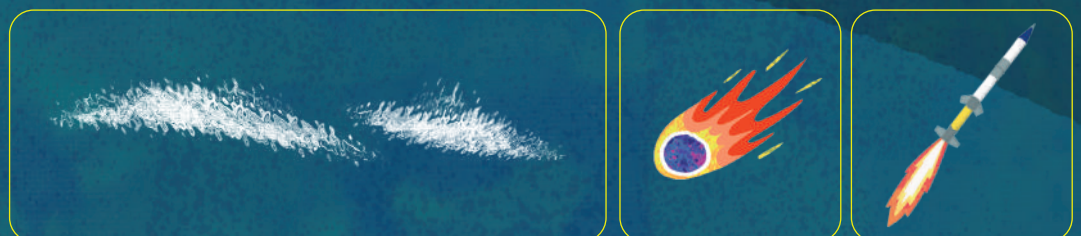**53 to 375 miles (85 to 600 km) above Earth's surface**

- Thickest and hottest layer in the atmosphere
- Temperature as hot as 3,600°F (2,000°C) near the top
- Molecules in this layer absorb the sun's high-energy ultraviolet and X-ray radiation
- Space travelers experience weightlessness
- You'll see: Spacecrafts, space stations, Aurora Borealis and Aurora Australis, low-Earth orbit satellites, research rockets, and the International Space Station

## Mesosphere

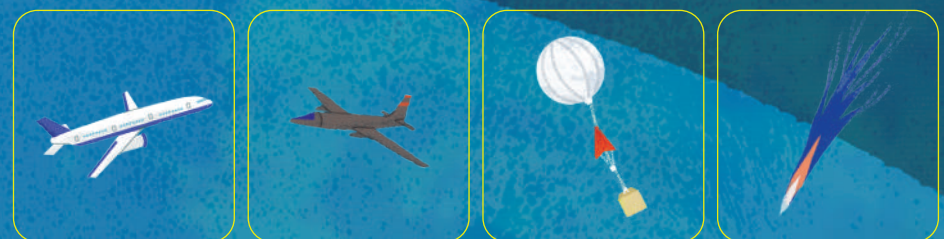**31 to 53 miles (50 to 85 km) above Earth's surface**

- Strange electrical discharges, including TLEs
- Coldest part of Earth's atmosphere
- Temperature gets colder the higher you go, from 5°F (−15°C) to −130°F (−90°C)
- You'll see: High-altitude clouds, meteorological rockets, meteors burning up, research rockets, rocket-powered aircrafts, and some types of TLEs

## Stratosphere

**12 to 31 miles (20 to 50 km) above Earth's surface**

- Airplanes fly here to avoid turbulence
- Temperature gets warmer the higher you go, reaching up to 5°F (−15°C)
- You'll see: Weather balloons and radiosondes, commercial and jet planes, spy planes, some clouds, some types of TLEs, and space jumpers

## Troposphere

**0 to 12 miles (0 to 20 km) above Earth's surface**

- Most weather occurs here and changes suddenly and violently
- Holds most of the oxygen we need to survive
- Temperature gets colder the higher you go, from 62°F (17°C) dropping to −60°F (−51°C)
- You'll see: Rüppell's griffon vultures (the world's highest-flying bird), some mountains (including Mount Everest), volcanoes, some commercial airplanes, hot air balloons, helicopters, most clouds, skydivers, and almost all weather

*Up, Up High: The Secret Poetry of Earth's Atmosphere*
by Lydia Lukidis, illustrated by Katie Rewse