

COUNTDOWN

T-minus: 10

9

8

Seat belt tightening.

7

6

Knuckles whitening.

5

4

Rockets roaring.

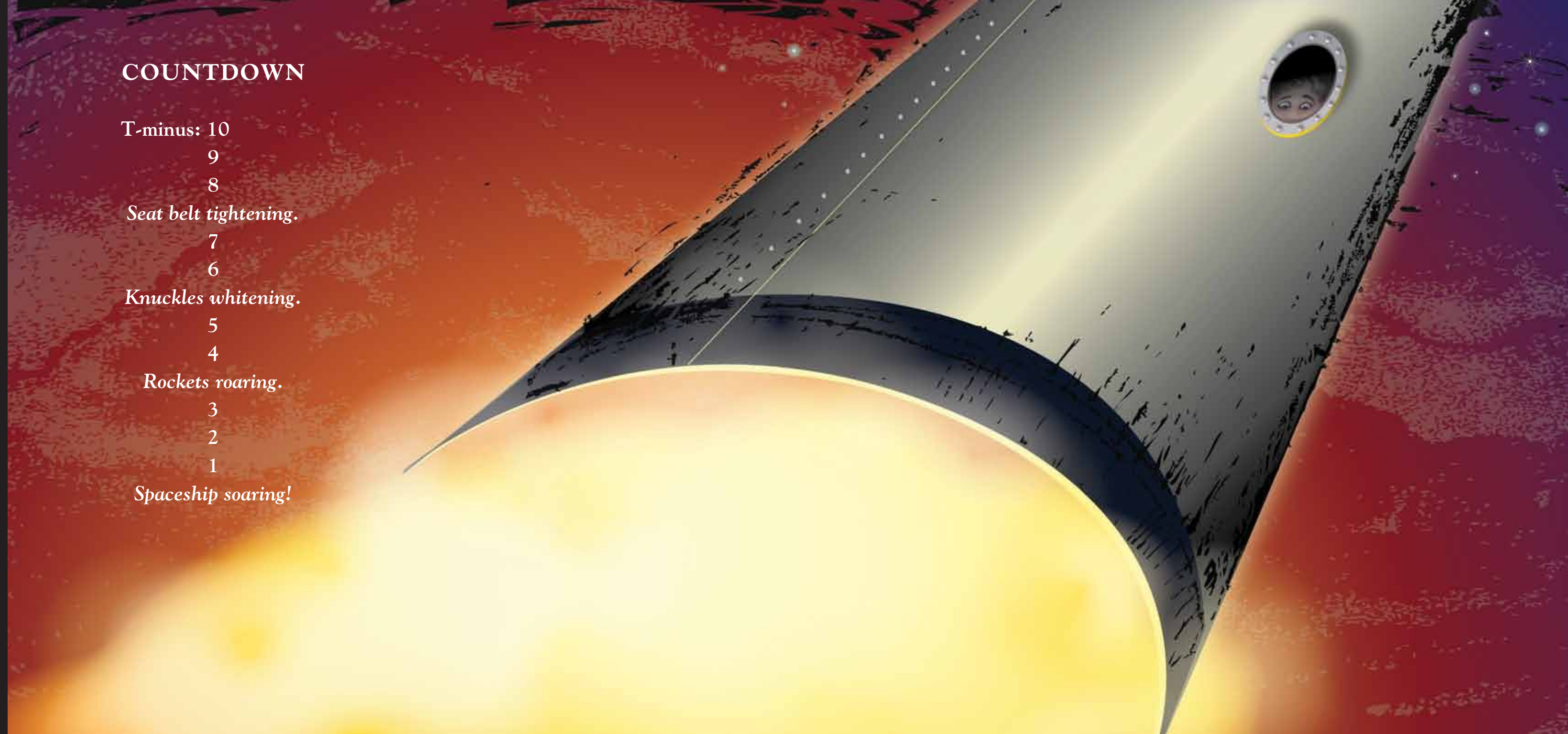
3

2

1

Spaceship soaring!

Fact: In order to reach space, a spaceship has to go really fast to break free from the powerful pull of Earth's gravity. When fuel is ignited inside a rocket, gases (and fire!) shoot out from the bottom of the rocket, pushing it upward. For example, the rockets that propelled the space shuttle helped it reach 17,500 miles (28,000 kilometers) per hour, or about 250 times faster than the speed limit on most highways.



BLAST OFF

Fact: There are five layers of atmosphere between Earth and outer space. The layer closest to Earth is called the troposphere. This layer extends 6 to 9 miles (10 to 14 kilometers) in the sky and is where most of our weather occurs. On top of that is the stratosphere, where airplanes usually fly. The stratosphere is also home to the ozone layer. Meteors burn up in the air of the mesosphere. The thermosphere is the layer in which the International Space Station circles the Earth. Most satellites orbit the Earth in the thermosphere and also the exosphere, the final layer of atmosphere before space. The exosphere ends and outer space begins at about 6,200 miles (10,000 kilometers) from the surface of the Earth. It took the space shuttle about 8½ minutes from launch to reach its orbit in the thermosphere.



S P A C E

(I'm outta here!)

Exosphere

Thermosphere

Mesosphere

Stratosphere

Troposphere

AFTER BLASTOFF

The Earth
fills
their window

and then
drops away,
like a

basketball

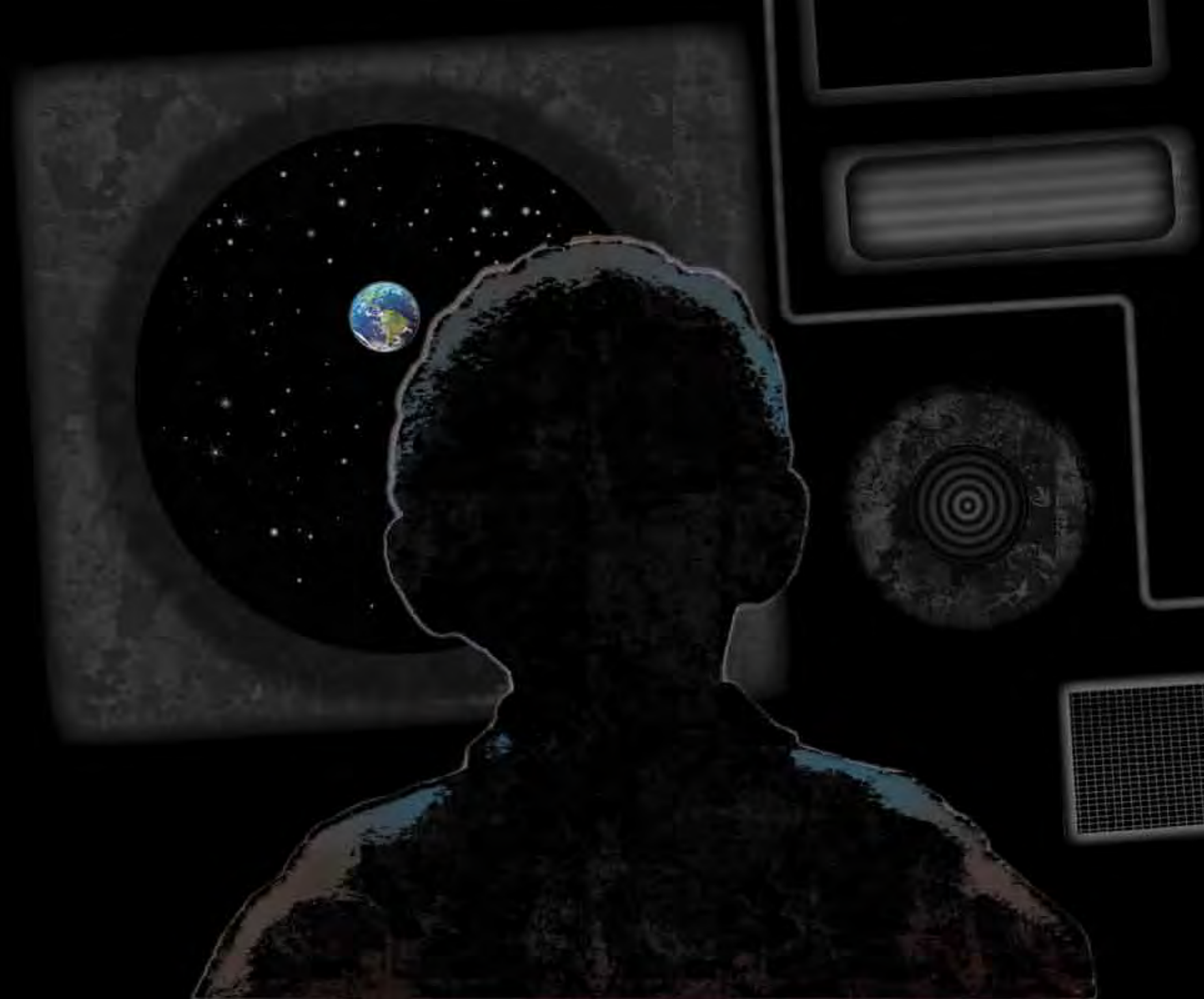
baseball

golfball

marble.

How far from home
they've traveled today.

Fact: America's *Apollo 11* mission was the first to put humans on the Moon. It took less than 4½ days to travel the 244,391 miles (393,309 kilometers) to get there. While Michael Collins piloted the *Apollo* in orbit around the Moon, Neil Armstrong and Buzz Aldrin landed in a lunar module and walked around on the dusty surface conducting experiments.



SPACE SUIT

No astronaut is ever caught without a suit in space.

The temperatures, extreme for sure, make it a hostile place.

Lack of air to breathe out there means oxygen is key.

The suit deflects as it protects from any injury.

Good work is done in shade or sun, though movement does lack grace.

No astronaut is ever caught without a suit in space.



Fact: Once astronauts reach space or the space station, they typically remove their suits and wear regular clothes, since they are inside a carefully controlled environment. However, they must suit up to go outside the spaceship. A space suit provides protection from the extreme temperatures in space, which range from hundreds of degrees above zero in sunlight to hundreds of degrees below zero in shadow. The suit also protects astronauts from solar radiation, glare, and micrometeoroids (small particles traveling through space), which could otherwise harm them. In space, there is no atmosphere, no air to breathe, so an astronaut carries an 8-hour supply of oxygen in a tank. Because working in a space suit is quite awkward (it weighs about 280 pounds on Earth and takes about 45 minutes to put on), astronauts practice space walks here on Earth by suiting up and performing tasks underwater in a huge pool. A space suit has so many different features that it is very expensive to produce: each costs more than \$10 million.