# BASIC GUIDE FOR SPACE TRAVELING

### 1. Your only job on the flight will be to kick back, relax, and enjoy the ride.

If you're taking a suborbital flight, which is what companies like Virgin Galactic and Blue Origin are offering, your ride will be a quick up-and-down to reach space, rather than a full orbit of the Earth. While the journey will be short, it's going to be a relatively easy ride for you compared to what professional astronauts experience. For starters, you won't need to worry about flying your spacecraft. That's all up to the spaceflight provider. "You won't have any responsibility other than to enjoy the experience — and not kick anyone else in the head," says Dr. Parazynski. "Their obligations on the flight are pretty straightforward."

As such, the training programs for suborbital space tourist experiences are relatively minimal, perhaps only a few days in length at most. "The downside of not having a lot of training is that you don't have the confidence that comes from lots of training," says Parazynski. "Contrast that with the training I had on the space shuttle, where we trained for hundreds and hundreds of hours for launching in space. If something were to go awry, we would know exactly what to do and our hearts wouldn't skip a beat."

So, other than learning to place your complete trust in your spaceflight provider, Parazynski recommends talking to people who have flown before in order to ease any nervousness. Dr. Chiao agrees: "The best advice I can give on launch — and it's easy to say, harder to do — is to try to relax and enjoy the whole process," he says. "Pay attention during your training, talk to other people who've been there if you can. And actually, you might be surprised — it's quite calm!"

### 2. But you will want to make sure you’re physically and mentally fit.

"I think people should treat this as their Olympics or Super Bowl. This is a really big life experience, and though you don't need to be an Olympic athlete or a Super Bowl champion to fly in space, it helps to be fit," says Dr. Parazynski. After all, your body will be experiencing quite a range of new sensations during your spaceflight."

But it's not just about physical fitness — mental fitness is key, too. "I think through fitness comes mental acuity as well," says Dr. Parazynski. "The more you can be engaged in the experience, the more you'll remember of it — it'll be more impactful to you."

### 3. The G-forces experienced on launch and reentry are not as intense as you might expect.

If you've ever watched a livestream of an astronaut launch, caught any Hollywood flick about space travel, or ridden Mission: Space at Walt Disney World's Epcot theme park, you know that during launch, astronauts get crushed back into their seats. (And, actually, during reentry, too!) They're experiencing strong G-forces, or a sensation of weight felt during acceleration. It's the same feeling you get when you speed up quickly in a car or zoom through a loop or a sharp curve on a roller coaster, but during a rocket launch, those forces are stronger and more sustained. While the experience might seem a little terrifying, the pros say it's quite manageable.

"The G-forces aren't nearly as bad as they show in the movies," says Dr. Chiao. "If you're good enough to be given medical approval to go on a trip like this, you're not going to have any problems handling the G-forces." He also notes that you'll likely go through centrifugal runs during your training to prep for the sensation — you'll be strapped into a spinning machine that lets you experience strong G-forces, just like that spinning amusement park ride where you're pressed against the wall and the floor drops.

But to make launch and reentry as comfortable on your body as possible, you'll want to physically relax your muscles so you don't fight against the G-forces. "If you relax and let your body sink into the launch couch, you're going to tolerate it much better," says Dr. Chiao. "If you're rigid, that's where you might hurt yourself. And make sure your limbs and arms are inside of the couch."

### 4. To prep for weightlessness, you should book a zero-G flight.

While it takes quite a bit of effort (and time and money) to get into space to experience weightlessness, you can actually experience the sensation right here on Earth — or rather, just slightly above it. All you need to do is book a reduced-gravity flight, where a plane flies in a series of parabolas (or arch-like shapes) during which passengers experience simulated weightlessness through free fall.

It's physically the same as skydiving or even riding a roller coaster, but in those two instances, your senses tell you you're actually falling. "When you're in a zero-G airplane, the airplane is falling at the same rate you are, so you're floating inside the airplane," says Dr. Chiao. "That's what it's like in a spacecraft when you get up into space and the engines cut off."

Through commercial companies like the Zero Gravity Corporation, anyone who can spare the cost of a ticket can experience weightlessness — and anyone who's planning on making a trip to space should definitely give it a go. "If they have the means, they should get on a zero-G flight before they go on a suborbital flight," says

Dr. Parazynski. "It would take some of the mystery out of 'what am I going to feel like?' and 'how do I move?'"

**5. Learning how to scuba dive is good weightlessness training, too.**

While being underwater isn't exactly like floating in space, it's a pretty good way to practice moving around in weightlessness. In fact, NASA even has a life-sized replica of the ISS set inside a giant pool, so that astronauts can train for spacewalks underwater.

"Moving in weightlessness comes to you very quickly when you spend some time underwater," says Dr. Parazynski. "Get neutrally buoyant underwater and very gently try and move yourself along the ocean floor or bottom of your pool. It doesn't take a lot of force, but it does take a lot of thought."

**6. Come up with a game plan for your few minutes in space.**

On suborbital flights, you're only going to have a few minutes in weightlessness, so you should plan out exactly how you want to spend your time up there. Figure out if you'd like to bring a memento like a family photo or college pennant for a fun picture. (U.S. Naval Academy graduates and former astronauts Wally Schirra and Tom Stafford famously put a "Beat Army" sign in the window of their Gemini VI spacecraft, so there's a long tradition of this). Decide in advance if you want to attempt what spaceflight veterans call "stupid astronaut tricks," like flips or spins. But most importantly, budget time to look out the window.

"The most important thing I would tell future astronauts is to savor the view out the window," says Dr. Parazynski. "It's, for lack of a better term, a God's-eye view, and so few people have ever had a chance to see it. It's really a beautiful thing to be hovering in space and looking down at your planet."

**7. Don’t worry about taking your own photos.**

"As far as taking photographs, I don't know that I would recommend it," says Dr. Chiao. "You're not going to be very good at it, first of all, because it takes a little bit of practice to get used to zero-G. Don't waste that time taking photos. Get your memories, look out those windows, and enjoy the whole experience of being weightless." Plus, given the price tag of these spaceflights, we're pretty sure that your operator will provide you with photos and videos of your journey anyway.

**8. When you get into zero-G, you might feel a little dizzy.**

The body functions a little bit differently when you remove gravity from the equation for a sustained period of time, and side effects may include dizziness and nausea. "You're going to feel full-headed because there's no longer gravity pulling fluid down

into your legs," says Dr. Chiao. "And so all that fluid comes up into your torso, and you can feel it right away. It feels kind of like you're standing on your head."

But the good news is, on suborbital flights, you might be able to avoid the worst of it. "The adrenaline and excitement are going to make you do okay at first, and by the time you might start feeling bad, it's time to strap back in and come back down," says Dr. Chiao.

### 9. If you're spending a few days in space, be prepared for some bumps and bruises.

On a suborbital flight, you won't have a ton of time in space, so you won't really have to worry about acclimating to zero-G. But some private spaceflight companies are looking to send their clients up into orbit for longer stays. If you're going to spend a few days or even a few weeks up in space, you're probably going to bump your head more than once, no matter how much you've trained for the experience.

"It's really funny watching rookie astronauts the first day or two up on a mission," says Dr. Parazynski. "We called them the bull in a china shop. They push off with full force and they crack their skull or bang their knee."

### 10. You're also going to make a mess.

Doing routine tasks like brushing your teeth (you can't just spit your toothpaste into a sink), clipping your fingernails (you don't want them floating off into your space station), and going to the bathroom (have you even thought about how to use a toilet without gravity?) are all very different experiences in weightlessness. Inevitably, you might have a few mishaps early on in your trip.

"Just sitting down for a meal, you put your fork down, and it's gone in 30 seconds," says Dr. Parazynski. "You may find it two days later in the cabin air cleaner because that's where the air currents have taken it." Luckily, a lost fork is an easy mess to clean up — and the situation can be prevented by tethering it down. Other messes are a different story.

"As far as using the restroom, that's what you need to pay attention to during your training. The toilet is not particularly simple and you have to be careful," says Dr. Chiao. (In case you were wondering, space toilets use airflow to guide things where they're supposed to go.) "But be prepared for making some messes," says Dr. Chiao. "And everybody has to clean up their own mess."

### 11. If you're going to do a spacewalk, the stakes are much higher for you and your crew.

If you want to zip around space with a jetpack like George Clooney in "Gravity," sorry, but chances are that's not going to happen any time soon. Most private astronauts will be safely tucked inside their craft for the duration of their flight. But it's not an

impossibility — private spaceflight company Space Adventures has partnered with Russian space organization Roscosmos to send two customers into space in 2023, and one of them will partake in a spacewalk.

Unlike suborbital flights, orbital flights with a spacewalk will require extensive training, given that spacewalks are inherently more dangerous than simply riding up to space in the relative safety of a spacecraft. "If you're careless with your tethers and you float off into the void, there's not a whole lot anyone can come do for you," says Dr. Parazynski. It's possible that a crewmate may be able to head out to rescue you, but then you're endangering their life as well. "It's really paramount for a spacewalker to think not just about their own health and well-being and their experience, but also that of their crewmates," he says.

### 12. If you're in a capsule, be prepared for a bumpy landing.

While the only way up to space is via a rocket, there are two ways to come back down: via a winged vehicle, like the space shuttle or Virgin Galactic's SpaceShipTwo, or via a capsule, like Apollo, Soyuz, and Blue Origin's New Shepard. The experiences are quite different, as winged vehicles land like an airplane on a runway, whereas capsules descend beneath parachutes onto land or water. While both experience a range of G-forces during reentry, capsules have a bit of a rougher ride, particularly at the very end.

"When the parachute comes out, you can expect to get jostled around a fair amount, so that can be disorienting," says Dr. Chiao. "Then, whether you're hitting the water or the ground, you're gonna get a good bump. There are shock-absorbing mechanisms, of course, that make it not too big a deal. But on Soyuz, you smack the ground pretty darn hard. It was kind of surprising!"

### 13. It'll be worth every penny.

Sure, it's going to cost a small fortune to go into space as a tourist — for now, that's somewhere in the ballpark of several hundred thousand dollars for a suborbital flight, and millions of dollars for longer duration orbital stays. But ask any astronaut, and they're sure to tell you it'll be worth the investment.

"What I would tell prospective astronauts is that it's going to change their lives forever," says Dr. Parazynski. "It's a perspective that can't be captured in emotion on film. Even in 3D-IMAX, there's no way to capture the way it's going to make you feel, the connectedness you feel to planet Earth, and the awe you have when you look out into the universe."

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