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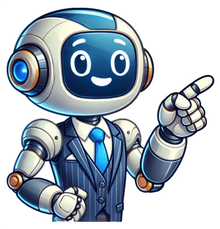

Performing a space walk without a suit will kill you in seconds. Marc Ward/Stocktrek Images / Getty Images/Stocktrek Images Without a spacesuit in space, you would become unconscious within 15 seconds due to lack of oxygen.Your blood and body fluids would boil and then freeze because of the extremely low air pressure, and your tissues would expand from the boiling fluids.You would face extreme temperatures and radiation exposure, and you could be hit by high-speed micrometeoroids or orbiting debris. The current space suit that's used for spacewalking from the shuttle and International Space Station is called the Extravehicular Mobility Unit or EMU. Because an Earth-like environment is created within the suit itself, a space suit allows you to walk around in space in relative safety. Space suits provide: Pressurized atmosphere - The space suit provides air pressure to keep the fluids in your body in a liquid state -- in other words, to prevent your bodily fluids from boiling. The pressure in the suit is much lower than normal air pressure on Earth (4.3 versus 14.7 PSI) so that the suit doesn't balloon and so that it's as flexible as possible.Oxygen - Space suits must supply pure oxygen, because of the low pressure. Normal air -- 78 percent nitrogen, 21 percent oxygen and 1 percent other gases -- would cause dangerously low oxygen concentrations in the lungs and blood at this low pressure.Regulated temperature -- To cope with the extremes of temperature, most space suits are heavily insulated with layers of fabric (Neoprene, Gore-Tex, Dacron) and covered with reflective outer layers (Mylar or white fabric) to reflect sunlight.Protection from micrometeroids -- Space suits have multiple layers of durable fabrics such as Dacron or Kevlar. These layers prevent the suit from tearing on exposed surfaces of the spacecraft.Someone has created a simulation that details what would happen to a human in space without a spacesuit - and it's quite disturbing.In this very graphic video, posted by DG EYE science on YouTube, they explain exactly what you can expect should a situation ever occur - not that you might have a trip to space this weekend or anything like that:Going to space already seems like a daunting enough task on its own, but the risks involved in the trip make it incredibly difficult too.If you were to be floating about in the abyss of outer space and you somehow lost your spacesuit, it wouldn't be good news.Spoiler though: You wouldn't react in the way that is often depicted in Hollywood films.The video introduces the scenario by highlighting this, saying that you 'surprisingly' wouldn't explode as science doesn't work that way, despite how gory and epic it may look like on the big screen.YouTube/@dgeyeWhat would actually happen in the first few seconds is - due to essentially being in a vacuum - the gases in your body would begin to expand, with the air in your lungs causing your 'lung tissue to rupture'.Good start then.Within five seconds, 'water on the surface of your eyes, skin and mouth' would evaporate.Water in your body would then begin to boil as parts of your body start to enlarge.We're only two-thirds water anyway.Don't worry though, as the elasticity of skin is strong enough to withstand the increase in pressure from your insides.The video states that 'your blood holds enough oxygen' for around 15 seconds of brain activity - though following this period, you would black out.90 seconds after that, your heart will slow down and eventually stop, disabling your brain.YouTube/@DGeyeThat's not it yet, because 90 seconds after that, you will finally die from asphyxiation, again dispelling the myth that you would instantly freeze as there is no atmosphere in space.Dr. Kris Lehnhardt, element scientist for the Human Research Program at NASA, told Live Science: "As you can imagine, given that 60 per cent of the human body is made up of water, this is a serious problem,"In essence, all of your body tissues that contain water will start to expand."An aerospace engineer at NASA named Jim LeBlanc actually came close to experiencing this.While testing the performance of spacesuits in a vacuum chamber in 1966, the hose which supplied pressurised air into his suit was disconnected.LeBlanc explained in the documentary series, Moon Machines: "As I stumbled backwards, I could feel the saliva on my tongue starting to bubble just before I went unconscious, and that's kind of the last thing I remember."Well, if you've heard all of this and still aspire to visit the depths of space, good luck to you.Imagine you're an astronaut exploring the vast expanses of space and uh oh! you're accidentally thrown out of your spacecraft's airlock. What would happen to your body if it were exposed to the vacuum of space if you weren't wearing a spacesuit?The first thing to note is that many Hollywood depictions of this scenario are overblown. They show people, unprotected by helmets or spacesuits, exploding or instantly freezing to death. In reality, the effects would be the same, but less exaggerated.An astronaut floating without a suit in space wouldn't survive, but their demise would happen within minutes, not within seconds, and it would be a gnarly exit, with boiling bodily fluids and a nearly frozen nose and mouth.You may like Related: Why is space a vacuum?Space is a vacuum devoid of air meaning that, unlike on Earth, there's no atmosphere and no pressure exerted by air molecules. Atmospheric pressure determines the temperatures at which liquids boil and turn gaseous. If the pressure exerted by the air outside a liquid is high, as it is at sea level on Earth, it's harder for bubbles of gas to form, rise to the surface and escape. But because there is virtually no atmospheric pressure in space, the boiling point of liquids decreases significantly."As you can imagine, given that 60% of the human body is made up of water, this is a serious problem," Dr. Kris Lehnhardt, an element scientist for the Human Research Program at NASA, told Live Science. In the absence of pressure, liquid water in our bodies would boil changing immediately from a liquid to a gas. "In essence, all of your body tissues that contain water will start to expand," he said.Some humans have actually been exposed to near-vacuums and survived to tell the tale. In 1966, an aerospace engineer at NASA, Jim LeBlanc, was helping to test the performance of spacesuit prototypes in a massive vacuum chamber. At some point in the test, the hose feeding pressurized air into his suit was disconnected. "As I stumbled backwards, I could feel the saliva on my tongue starting to bubble just before I went unconscious, and that's kind of the last thing I remember," he recalled in the 2008 "Moon Machines" documentary series episode "The Space Suit."Get the worlds most fascinating discoveries delivered straight to your inbox.The formation of gas bubbles in bodily fluids, known as an ebullism, also occurs in deep-water scuba divers who surface too quickly because they go from an underwater environment of high pressure to low pressure at the water's surface. For suit-less astronauts, the blood flowing through the veins boils less quickly than water in the tissues because the circulatory system has its own internal pressure, but massive ebullism in the body's tissues would result rapidly. A 2013 review in the journal Aerospace Medicine and Human Performance that looked at previous exposures to vacuums in animals and humans found that they lost consciousness within 10 seconds. Some of them then lost control of their bladders and bowel systems, and the swelling in their muscles constricted blood flow to their hearts and brains, as their expanded muscles acted as a vapor lock."No human can survive this death is likely in less than two minutes," Lehnhardt said.According to NASA's bioastronautics data book, the vacuum of space would also pull air out of your lungs, causing you to suffocate within minutes. After an initial rush of air surged out, the vacuum would continue to pull gas and water vapor from your body through your airways. The continuous boiling of water would also produce a cooling effect the evaporation of water molecules would absorb heat energy from your body and would cause the parts near your nose and mouth to nearly freeze. The remainder of your body would also cool, but it would do so more slowly because not as much evaporation would take place.As astrophysicist Paul Sutter told Forbes, temperature is a measure of how much energy atoms and molecules have to move about and because space is almost empty, there's not much to move at all, making it "cold." This also means that there isn't matter in space to transfer heat to. However, a person could freeze from the evaporation of their body's water and the slow loss of heat via the radiation emanating from their body.The lesson from all of this? Always wear a spacesuit.Editor's note: This story was updated at 12:45 p.m. EST on Nov. 15 to state that Dr. Kris Lehnhardt is an element scientist at NASA.Originally published on Live Science.How Long Can You Survive in Space Without a Suit?. If youve seen sci-fi movies, you may have seen people in space without a suit. But acan you survive? How long can you survive in space without a suit?Fortunately, weve never shot a person into space before just to see what happened. We did put dogs and chimpanzees into a vacuum chamber once, though. Thats far less fortunate. But the dogs exposed to the vacuum for around 3 minutes all made a pretty good recovery, and those under 2 minutes made a full one.Video advice: What will you be Turned Into in Space in 60 Seconds Without a SpacesuitIf you like this video put Thumb Up button (please) and If youve seen sci-fi movies in space, you may be familiar with the scenes exposing people to the endless vacuum of space. Pop culture tells us that this never ends well. We see people freezing solid immediately, exploding and swelling like balloons, their blood boiling, or maybe even a combination. What were trying to get at is that pop culture has tied the idea of being unprotected in space to immediate death. But what really happens when youre exposed to space without a suit? Can you survive at all? If so, for how long?What will happen if you go to space without a spacesuit?To understand this, we will have to first know why astronauts/cosmonauts wear space suits. It is obvious that special space suits have been created because living in space is different than living on earth, or even flying in a aeroplane.For instance, frequency higher your friends voice if theres air between both of you, because seem requires a medium to visit in one spot to another. So, wide you cant speak with one another because theres no air between you. But this isnt an issue which may be solved by putting on an area suit.Video advice: How Long Can You Survive Without Spacesuit in Space?In the movies, when a human without a spacesuit is thrown out into space, there is no doubt that something gory is about to take place. A close-up shot of a face literally frozen in horror shows up on the screen. Funny enough that is not how it goes in reality. If you do get thrown out into the big dark space you will notice a lack of air first while panicking. Dont even try to hold your breath as this might kill you faster than breathing out.So what is the difference between space and earth. You must have heard that every object attracts every other object. This force of a ttraction depends on the mass of the two objects attracting each-other and the distance between them. So earth also attracts every object. This force is called gravity. Because the force reduces as you go away from earth, the further you are, the less gravity you will experience. There may be a distance where this force (gravity) is almost zero (not completely zero).Video advice: What Happens to You in Space without a Space Suit?THE QUICK AND THE CURIOUS [FAQ]15 secondsAstronauts need space suits to stay alive. You could only last 15 seconds without a spacesuit you'd die of asphyxiation or you'll freeze. If there's any air left in your lungs, they will rupture.Spacesuit Vacuum Test Due to the fact that a human has never actually been in space without a suit, we must look to the following test to find our information. On December 14, 1966, Jim LeBlanc accidentally became the only human to survive space like conditions.Humans do die if left in outer space without a space suit. ... There are other dangerous effects that the spacesuits protect against, such as cold and radiation, but these do not cause immediate death, and they definitely don't cause explosion. Humans exposed to the vacuum of space don't explode.And for astronauts on the International Space Station, that means they get to age just a tiny bit slower than people on Earth. That's because of time-dilation effects. First, time appears to move slower near massive objects because the object's gravitational force bends space-time.there are no hours in space. an hour is a not too convenient unit that is 1/24th of one revolution by the earth on its axis of rotation. Earth gravity is not that strong so it should only dilate time by a little bit.Imagine drifting through the velvet blackness of space, stars twinkling in every direction, but suddenly, you realize youre not wearing a suit. The silence is deafening, your heart pounds, and panic threatens to take over. Most people picture instant death or perhaps a dramatic explosion, but the reality of what happens to the human body in the vacuum of space is far more chilling, fascinating, and horrifying than any Hollywood movie can capture. Lets unravel the true story of what would happen to you, second by second, if you found yourself exposed to the cosmos with nothing but your skin to protect you. The First Shocking Seconds: You Dont Explode (image credits: unsplash) The idea that a human would explode in space is a common myth, but it couldnt be further from the truth. The body is held together by strong tissues and skin, which act as a surprisingly effective barrier against the vacuum. In the first moments, youd feel the air in your lungs rush out, but your body itself would not burst apart. Instead, the lack of atmospheric pressure would make all the dissolved gases in your blood form bubbles, but not instantly. Your skin would swell, but only by about twice its normal sizeenough to look puffy and strange, but not enough to explode. This swelling would feel very uncomfortable, but it would not cause immediate death. Losing Your Breath: Air Escapes Fast (image credits: wikimedia) Within the first 10 seconds, youd instinctively try to hold your breath, but thats precisely what you shouldnt do. Holding your breath would only cause your lungs to rupture as the air inside them expands. If you simply exhaled, the air would rush out, and youd be left gasping for nothing. With no oxygen to draw in, your body would start to run out of the precious fuel it needs for survival. Youd quickly lose consciousness, usually within 15 seconds, as your brain is starved of oxygen. Before you even realized what was happening, your world would begin to fade. Unforgiving Vacuum: The Rapid Decompression (image credits: wikimedia) The vacuum of space is relentless. On Earth, our bodies are accustomed to atmospheric pressure pushing in on us at all times. Take that away, and the internal pressure within your body has nowhere to go. Your eardrums would likely rupture, and the moisture on your tongue and eyes would begin to boil awaynot because of heat, but because boiling point drops dramatically in a vacuum. This would be a bizarre, unsettling sensation, with your mouth and eyes feeling prickly and dry almost instantly. These dramatic changes can happen in mere seconds, making the experience both terrifying and surreal. Chilling Temperatures: Not Frozen Instantly (image credits: wikimedia) Its a common belief that space is so cold youd freeze instantly, but thats not quite right. Space itself doesnt have a temperature in the way we think of it, since its mostly empty. Without air to conduct heat away from your body, youd actually lose heat very slowly through radiation. You wouldnt freeze solid in seconds; instead, your body would cool off over several hours. The real danger from temperature is the boiling off of water from your skin and lungs, not immediate freezing. So, the cold is a slow killer, not a sudden one. The Suns Deadly Rays: Unfiltered Radiation (image credits: unsplash) If youre exposed to sunlight in space, youd be bombarded with intense ultraviolet and cosmic radiation. On Earth, our atmosphere shields us from these deadly rays, but in space, theres no protection. Your skin would begin to burn within seconds, similar to a severe sunburn but much faster and deeper. If you were in the shadow of a planet or spacecraft, youd be spared the radiation but face even colder temperatures. Either way, your body is completely vulnerable, and the damage from radiation would add to your agony. Swelling and Bloating: The Gory Details (image credits: unsplash) With no external pressure to keep your bodily fluids in check, youd begin to swell as the water in your tissues vaporizes. This swelling is shocking to imagineyour cheeks would puff up, fingers would look sausage-like, and your entire body would take on a grotesque, ballooned appearance. Despite this, your skin is remarkably resilient, and it would keep you more or less intact. You wouldnt pop like a balloon, but the discomfort and distortion would be extreme. Blood and Bubbles: Embolism Threats (image credits: unsplash) One of the most dangerous effects of space exposure is the formation of gas bubbles in your bloodstreama condition called ebullism. As dissolved gases come out of solution, they form bubbles that can block blood flow, much like what happens in divers who ascend too quickly. Your veins and arteries could become clogged, causing tissue damage and severe pain. This process would add a new layer of suffering to an already desperate situation, and it could be fatal if you remained exposed for more than a minute or so. Loss of Consciousness: The Clock Is Ticking (image credits: unsplash) As the seconds tick by, the lack of oxygen becomes critical. After about 10 to 15 seconds, youd lose consciousness. This is actually a small mercyonce youre unconscious, you wouldnt feel the pain or panic anymore. If you were rescued and repressurized within the next minute or so, its theoretically possible you could survive, but every passing second makes a full recovery less likely. The clock is truly your enemy in space. Water Evaporation: The Boiling Effect (image credits: unsplash) Even though you wouldnt boil on the outside, the water lining your respiratory tract would start to vaporize, making it impossible to speak, cough, or even scream. Your tongue would feel like sandpaper, and your eyes would sting as the moisture evaporated. This isnt the kind of boiling that burns, but its just as deadly, as your body rapidly loses fluid and your lungs become incapable of functioning. Every breathif you could take onewould be agony. Frozen Tears: The Fate of Body Fluids (image credits: wikimedia) In the vacuum of space, your saliva, sweat, and tears would quickly evaporate, leaving your mouth and eyes painfully dry. If you happened to cry, your tears would turn into tiny crystals and drift away into the darkness. Blood, however, would remain mostly liquid inside your veins thanks to the pressure of your own tissues, but any cuts or exposed wounds would see blood boiling away in seconds. This bizarre scenario is both haunting and oddly beautifula reminder of how alien space truly is. Hearing the Silence: Deafening Quiet (image credits: unsplash) Space is utterly silent. Without air to carry sound, youd hear nothing except the rush of your own blood and the pounding of your heartat least, until you lost consciousness. The silence would be so complete it would feel oppressive, almost suffocating in its totality. Its hard for anyone on Earth to imagine just how profound and eerie this silence would be, especially as one of your last sensations. Eyes Wide Open: Vision Disturbances (image credits: unsplash) Without atmospheric pressure, the fluids in your eyes would begin to boil, causing your vision to blur and darken. You might see stars dance before your eyes, not from the cosmos outside, but from oxygen deprivation and the physical trauma happening inside your eyeballs. This visual chaos would be both frightening and disorienting, making your final moments even more surreal. Struggling Heart: Cardiac Consequences (image credits: unsplash) Your heart would keep beating for a short while, desperately trying to circulate oxygen-starved blood. As pressure dropped and gases formed bubbles, your heart would struggle to keep up. Eventually, as oxygen levels plummet and tissues become starved, your heart would begin to fail. This would be the final step before true biological deatha slow, silent surrender in the most hostile environment imaginable. DNA Damage: Invisible Threats (image credits: unsplash) Space is filled with high-energy particles and cosmic rays that can rip through your DNA, causing mutations and cellular destruction. In a prolonged exposure, your genetic material would be shredded, increasing your risk of cancer and other diseases if you somehow managed to survive. This invisible assault on your cells is one of the least understood but most dangerous aspects of space travel without proper protection. Would You Freeze or Suffocate First? (image credits: unsplash) The answer is clear: youd suffocate long before you froze. The lack of oxygen would render you unconscious after about 15 seconds, and irreversible brain damage would set in after about two minutes. Freezing, on the other hand, is a slow process in the vacuum of space. Your body would lose heat through radiation, but it would take hours to reach freezing temperatures. So, while the cold is certainly a threat, its not your most immediate concern. Rescue in the Nick of Time: Is Survival Possible? (image credits: unsplash) If you were rescued and repressurized within about 60 to 90 seconds, theres a chance you could survive with minimal long-term damage. NASA experiments with animals in the 1960s showed that brief exposure to vacuum is survivable if prompt medical care is given. However, the longer you remain exposed, the greater the risk of permanent injury or death. Every second counts in the unforgiving environment of space. Historical Incidents: Real-Life Encounters (image credits: unsplash) There have been a few terrifying moments when astronauts came dangerously close to exposure. In 1965, a spacesuit leak during a NASA test left an astronaut unconscious for seconds, but he survived thanks to rapid intervention. In another incident, a cosmonauts suit depressurized during reentry, with tragic results. These rare but real events underscore just how perilous space exploration can be, even with the best technology. What About Animals? Lessons from Experiments (image credits: wikimedia) Before humans ever ventured into space, scientists tested the limits of exposure using dogs, monkeys, and even mice. These experiments were grim but provided crucial information. Animals lost consciousness within 15 seconds, but many survived if repressurized quickly. The information gathered from these early tests has helped make modern space travel far safer for todays astronauts. Why Spacesuits Are Lifesavers (image credits: unsplash) Spacesuits are marvels of engineering, designed to mimic Earths environment and protect against all the dangers of space. They provide pressure, oxygen, temperature control, and radiation shielding, all in a wearable form. Without these suits, even the briefest stroll outside a spacecraft would be fatal. The complexity and necessity of spacesuits are a testament to just how inhospitable space truly is. The Psychological Terror: Facing the Void (image credits: wikimedia) Its easy to focus on the physical dangers of space, but the psychological impact is just as profound. The sheer isolation, the silence, and the knowledge that help is so far away would be terrifying. Even astronauts, trained for every contingency, describe space as both awe-inspiring and deeply unsettling. Facing the void without protection would push the limits of even the bravest mind. Reflections on Human Fragility (image credits: unsplash) Space lays bare the delicate thread that connects us to life. Our bodies, perfectly adapted for Earth, are hopelessly outmatched by the cold indifference of the cosmos. Its both humbling and inspiring to realize how much we rely on technology, ingenuity, and each other to survive in such a hostile place. Would you dare to stare into the abyss, knowing what you know now?Stepping out into the vacuum of space without the protection of a spacesuit is a death sentence, plain and simple. The immediate effects are dramatic and devastating, a cascading failure of the systems that keep us alive and functioning on Earth. Within seconds, youd experience a rapid cascade of physiological failures including oxygen deprivation, drastic temperature fluctuations, and extreme pressure differences that would have you unconscious in under a minute, and dead shortly thereafter. Its a scenario straight out of a nightmare, but understanding the science behind it can be fascinating, if morbidly so.The Instant Assault on Your SystemThe first and most critical issue is oxygen deprivation. Your blood holds enough oxygen to fuel brain activity for roughly 15 seconds. After that, youd black out, slipping into unconsciousness. Brain death follows within approximately three minutes.But lack of oxygen is only the beginning. The near-instantaneous pressure drop from 1 atmosphere (the pressure were accustomed to on Earth) to near-zero in space causes a phenomenon known as ebullism. This is where the water in your bodily fluids, including blood and saliva, begins to vaporize. Think of it as your body trying to boil itself from the inside out.This isnt the dramatic, bubbling-blood-like-lava effect often depicted in science fiction. Your circulatory system is a closed loop, so your blood wont actually boil explosively unless your lungs rupture first.However, the water evaporating will cause tissues to swell significantly, perhaps doubling in size. This swelling, coupled with the lack of atmospheric pressure, would cause extreme discomfort and further disrupt bodily functions.Then theres the issue of temperature. Space itself doesnt have a temperature; its a vacuum. However, objects in space, like you, are subject to intense radiation from the sun on one side and extreme cold on the other. If youre in direct sunlight, youd quickly overheat. If youre in the shadow of a planet or spacecraft, youd rapidly freeze. There are no air molecules to help regulate the temperature.Finally, youd be bombarded by harmful radiation. The Earths atmosphere and magnetic field shield us from the suns and cosmic rays. Without that protection, youd receive a massive dose of radiation, causing immediate cellular damage.The AftermathEven after death, the environment of space dictates a unique decomposition process. With no oxygen to fuel decay, your body wouldnt decompose in the traditional sense. If exposed to direct sunlight, it would likely mummify, becoming dehydrated and preserved. If in permanent shadow, it would freeze solid, essentially becoming a space popsicle.If sealed inside a spacesuit (assuming it somehow failed catastrophically without completely destroying you), decomposition would occur, but at a much slower rate due to the limited amount of oxygen.FAQs: Venturing Further into the VoidHere are some frequently asked questions to delve deeper into the effects of space on the human body without protection:1. How long could a human survive in space without a suit?As stated before, youd likely remain conscious for about 15 seconds, and brain death would occur within three minutes. The combination of oxygen deprivation, ebullism, temperature extremes, and radiation exposure are rapidly fatal.2. Would my blood really boil in space?Yes, but not in the way you might think. The lack of atmospheric pressure would cause the water in your blood and other bodily fluids to vaporize. This is ebullism, not the explosive boiling depicted in movies. Your circulatory system helps to prevent rapid, violent boiling, but the vaporization would still cause significant swelling and tissue damage.3. What happens to exposed skin in space?Exposed skin would suffer a multitude of problems. First, the lack of pressure would cause the water in your skin to evaporate, leading to severe dehydration and damage. Youd also be subjected to extreme temperatures, either burning from the sun or freezing in the shade. Furthermore, the intense radiation would cause immediate and severe sunburn.4. Can you survive in space for 30 seconds?Youd likely lose consciousness within 15 seconds due to lack of oxygen, but you wouldnt necessarily be dead at the 30-second mark. However, the damage accumulating within that short time frame would be irreversible. Youd need immediate and drastic medical intervention to have any chance of survival.5. What do they do with a body if an astronaut dies in space?Ideally, a deceased astronauts body would be returned to Earth with the surviving crew. On a long mission, the body could be preserved in a controlled environment to slow decomposition. There are ethical considerations and ongoing discussions about alternative methods, but currently, bringing the body home remains the priority.6. Has anyone ever floated away in space?Thankfully, no astronaut has been irretrievably lost in space. There have been instances where astronauts have become detached from their spacecraft, but they were either tethered or quickly retrieved. Bruce McCandless famously performed the first untethered spacewalk using a Manned Maneuvering Unit in 1984.7. Are there any human bodies in space?No. Every astronaut or cosmonaut who has died during a space mission has been returned to Earth.8. How fast would you freeze in space?Freezing isnt the primary concern in the immediate aftermath of exposure to the vacuum of space. The lack of oxygen and ebullism are far more pressing threats. It would take 18-36 hours for your body to freeze solid through radiative cooling if you were in a consistently shaded area.9. Does the color of blood change in space?No, your blood would still be a dark-red, maroon color. The lack of atmospheric pressure wouldnt alter its chemical composition.10. What happens if you bleed in space?Bleeding in space would result in the blood forming a sphere due to surface tension. The lack of atmospheric pressure would cause the water in the blood to vaporize, potentially leading to rapid dehydration and other complications if the wound wasnt immediately sealed.11. What does space smell like?Astronauts have described space as smelling like burning metal, ozone, gunpowder, or burnt almond cookies. The exact scent is likely a combination of various factors, including outgassing from spacecraft materials and reactions between oxygen and the airlock.12. How long can a human stay in space?The longest continuous time a human has spent in space is 437 days, by Russian cosmonaut Valeri Polyakov. Sergei Krikalev holds the record for the most cumulative time in space, with over 803 days.13. What happens if you cry in space?Tears in space dont fall. Instead, they form a blob on your face that can irritate your eyes. Astronauts need to carefully wipe away the tears to avoid discomfort.14. Is being underwater like being in space?While not exactly the same, underwater training provides a reasonable simulation of the weightlessness experienced in space. Astronauts use neutral buoyancy labs to practice spacewalks and other tasks in a low-gravity environment.15. How much do astronauts get paid?Civilian astronauts employed by NASA typically earn salaries ranging from GS-11 to GS-14 on the federal governments pay scale, which translates to roughly $66,000 to $144,566 per year.A Stark ReminderThe extreme environment of space highlights the fragility of human life and the incredible engineering required to keep us alive and thriving beyond our planet. While the thought of venturing into space without a spacesuit is terrifying, understanding the science behind it deepens our appreciation for the technology that allows us to explore the cosmos safely. Organizations like The Environmental Literacy Council help us learn and teach important lessons about the environment, whether its on Earth or in space (enviroliteracy.org). Stepping out into the vacuum of space without the protection of a spacesuit is a scenario fraught with immediate and catastrophic consequences. Its not the slow, drawn-out suffering depicted in some science fiction. Instead, its a rapid and brutal series of physiological failures driven by the extreme conditions of space. The primary culprits are the lack of atmospheric pressure, the absence of breathable oxygen, and the intense radiation and temperature extremes. Heres a detailed breakdown of what would occur:Within seconds of exposure, the lack of atmospheric pressure causes the moisture on your skin, eyes, and tongue to begin to boil. This isnt a hot, bubbling boil, but rather a rapid vaporization due to the extremely low pressure, a phenomenon known as outgassing. Simultaneously, the air in your lungs would expand rapidly, trying to equalize with the surrounding vacuum. This expansion will cause your lungs to rupture, a devastating and painful injury. The result is a near-instantaneous inability to breathe.The blood in your body contains dissolved gases, and without the external pressure of Earths atmosphere, these gases would also start to vaporize. Although the blood would not actually boil (at the typical human body temperature), the dissolved gases would form bubbles, causing a condition known as embolism. These bubbles can block blood flow, leading to organ damage and failure.Within 15 seconds, the lack of oxygen supply to your brain would render you unconscious. Your blood does contain a small reserve of oxygen, but it is quickly depleted. After this, the body enters a state of hypoxia which results in the failure of vital organ function. Complete brain death follows within approximately three minutes. Your eardrums will likely burst due to the sudden pressure differential.The lack of a protective atmosphere also means exposure to intense solar radiation, which includes harmful ultraviolet radiation. This radiation can cause severe burns and damage to your DNA. The extreme temperature swings in space also present a challenge, though its affect will be secondary to the lack of air pressure. Without a suits thermal protection, you would quickly freeze or overheat, depending on whether youre in direct sunlight or shadow.In summary, exposure to space without a spacesuit leads to a swift, violent death characterized by lung rupture, blood embolisms, loss of consciousness, asphyxiation, and rapid organ failure.What Happens in the First Few Seconds?4 Seconds: The Onset of OutgassingMoisture begins to boil: The lack of air pressure causes fluids on your bodys surface (eyes, tongue, skin) to vaporize.The beginning of discomfort: This initial phase would be highly uncomfortable, marking the start of rapid physiological failure.8 Seconds: Internal Organ Damage BeginsLungs are rupturing: Expanding air in your lungs leads to immediate and irreparable damage.Internal gas expansion: Gases inside your body expand, causing internal tissues and organs to begin to rupture.15 Seconds: Loss of ConsciousnessAsphyxiation takes hold: The lack of oxygen supply to the brain causes rapid unconsciousness.Eardrums burst: The rapid change in pressure causes mechanical damage to your ear structure.30 Seconds and BeyondBlood begins to boil: Dissolved gases in your blood form bubbles, a process leading to organ damage.Brain death: Within three minutes, the lack of oxygen supply leads to irreversible brain damage.Frequently Asked Questions (FAQs)1. How Long Can a Human Survive in Space Without a Suit?A human can only survive for approximately 1 minutes in the vacuum of space without a spacesuit. However, consciousness would be lost within about 15 seconds. Complete brain death would occur in approximately three minutes.2. What Would Happen if I Tried to Breathe in Space?Trying to breathe in space is extremely dangerous. The lack of oxygen means theres nothing to inhale, and the existing air in your lungs would expand and rupture your lungs.3. Why Does Blood Boil in Space?In the absence of atmospheric pressure, the liquids in your body, including blood, would vaporize. While not a traditional boil, the dissolved gases in your blood form bubbles, causing a serious and potentially fatal condition called embolism.4. Would a Body Decompose in Space?In the vacuum of space, without the presence of atmospheric gasses, a corpse would not decompose in the way it would on Earth. It would simply freeze. Inside a spacesuit, bacteria could cause decomposition, but the limited oxygen supply would slow the process considerably. If outside a suit, there would be no external organism such as insects or fungi to assist with decomposition.5. How Does Space Smell?Astronauts have described space as having a unique smell, often compared to burning metal, ozone, walnuts, brake pads, gunpowder, or burnt almond cookies. These smells are likely caused by the ionization of particles in space.6. Do Astronauts Age Differently in Space?Due to the effects of time dilation, astronauts on the International Space Station (ISS) age slightly slower than people on Earth. This difference is extremely minimal.7. Are There Any Human Bodies Floating in Space?No, there are no human bodies permanently floating in space. All astronauts who have died during missions have been returned to Earth. The Columbia astronauts were badly mangled in the disaster and recovered, while the Challenger crew never made it into space.8. Why Dont Astronauts Wear Sunglasses Inside Their Helmets?Astronauts dont wear sunglasses inside their helmets because their visors are already heavily tinted to provide adequate sun protection. In addition, sunglasses could not be removed when the area is in darkness, hindering vision.9. Has Anyone Ever Been Lost in Space?Thankfully, no astronauts have ever been irretrievably stranded away from their spacecraft. Some, like Bruce McCandless, have floated a significant distance from their spacecraft but have returned safely.10. Could You Survive in Space for 1 Second?No, you could not survive for one second in the vacuum of space. You would begin to experience the effects of outgassing, lung rupture, and loss of consciousness very rapidly. Consciousness would be lost within 10-15 seconds.11. What is the Temperature in Space?The average temperature of the universe is extremely cold, about 3 degrees above absolute zero (-270 degrees Celsius or -454 degrees Fahrenheit). However, objects in direct sunlight can become very hot due to solar radiation.12. Is There Oxygen in Space?Oxygen does exist in space, formed through nuclear fusion reactions in stars. However, it is not in a breathable form and does not exist in quantities that could sustain human life without a life support system.13. How Much Do Astronauts Get Paid?The salaries of NASA astronauts in the U.S. range from $39,423 to $426,495, with an average salary of around $87,000.14. Why Did We Stop Going to the Moon?The Apollo program was canceled due to funding cuts by the U.S. President and Congress. Apollo 18, 19, and 20 were canceled as budgets dwindled.15. What is a Solar Day on the International Space Station?A solar day on the International Space Station (ISS) is much shorter than a day on Earth. It is around 90 minutes long, meaning crew members experience a sunrise or sunset roughly every 45 minutes. Many of us have dreamed of going into space. Perhaps you've imagined what it would be like to visit the International Space Station or even explore new worlds. But traveling in space brings a whole set of challenges and hostile environments, so it's vital to recreate the conditions on Earth that have allowed life to evolve and flourish.Spacesuits allow astronauts to venture outside their spacecraft for short periods, by providing the air, water, pressure and physical protection needed for a human to survive. But what would happen without one of these advanced suits?Sci-fi movies and shows, including "2001: A Space Odyssey" and "The Expanse," have portrayed astronauts suffering and surviving short exposures to outer space without a spacesuit, while others have depicted a range of grisly deaths.You may like But here in the real world, how long could a person survive if thrust into the harsh vacuum of outer space? The short answer is, not very long.Related: The 25 scariest spaceflight moments show dangers in orbit and beyond"Within a very short time, a matter of 10 to 15 seconds, you will become unconscious because of a lack of oxygen," according to Stefaan de Mey, a senior strategy officer at the European Space Agency (ESA) charged with coordinating the strategy area for human and robotic exploration.That may seem like a very short time, but it's because you would not want to hold your breath before being thrust into outer space. In the dark void of space, the oxygen that sustains us would become a serious problem.Breaking space news, the latest updates on rocket launches, skywatching events and more!"The oxygen starts expanding and rupturing your lungs, tearing them apart and that would cause boiling and bubbling of your blood, which immediately will cause embolism and have a fatal impact on your body," de Mey said.Divers face a similar danger when the water pressure decreases as they ascend from the depths. Before entering space unprotected, you'd need to empty your lungs as much as possible. The complete lack of pressure also causes other, though less immediately, deadly issues.Astronaut Ed White floats in the microgravity of space outside the Gemini IV spacecraft. (Image credit: NASA/Jim McDivitt)Bodily fluids, such as saliva and tears, would begin to boil. A human body would also expand, but the skin would be elastic enough to cope with the pressure change, de Mey said, adding that horrific movie portrayals of exploding humans are not accurate.In the best-case scenario, you'd have a few seconds before the oxygen in your bloodstream would be used up, causing you to pass out. Because you'd be unable to alter your dire situation, brain death would follow within minutes, unless you were rescued and brought back to the safety of the pressurized, oxygen-rich environment of a spacecraft and resuscitated.In addition to providing vital oxygen and pressurization, spacesuits also shield astronauts from other dangers and harm.NASA astronaut Stephen Bowen (right) and UAE astronaut Sultan AlNeyadi work on an antenna assembly as the Earth and moon hang overhead outside the International Space Station. (Image credit: NASA TV)"There is a temperature problem and radiation and micrometeoroid threats," de Mey said. "So spacesuits are designed to provide physical protection of the astronauts in outer space."Whether an astronaut is in sunlight or shaded from the sun, they would experience extreme temperatures, ranging from minus 240 to 250 degrees Fahrenheit (minus 150 to 120 degrees Celsius) in low Earth orbit (LEO). These conditions would cause burns or freezing, though not immediately in the latter case, as body heat is not easily conducted away in a vacuum.Spacesuits also protect from various types of radiation. In LEO, there is protection from some forms of radiation. Prolonged or long-term exposure to electromagnetic radiation from the sun would cause health issues, including radiation sickness and an increased risk of cancer. UV light would also burn the skin. The added misfortune of particles from a solar flare reaching the astronaut at the time they were exposed in space would exacerbate many of these issues.Micrometeoroids and space debris pose another danger. These travel at a rate of a few or tens of kilometers per second and are a threat to satellites, spacecraft and astronauts conducting extravehicular activities (EVAs), or spacewalks. Though extremely unlikely to affect an unprotected astronaut's chances of survival given the astronomically tiny chances of being hit during a short time in space, spacesuits are designed with multiple layers to help protect astronauts from any possible micrometeoroids or space debris whizzing around in orbit.Being in space without an EVA suit becomes very deadly very, very quickly. While someone could survive this grim scenario, they would want to have very little air in their lungs and get back to the safety of a pressurized spacecraft within seconds or hope to be rescued and resuscitated within minutes.Asked by: Peter Green, Saffron Walden Surprisingly, you probably wouldnt explode. Skin is almost completely gas-tight and strong enough to withstand a pressure differential of well over one atmosphere. You also wouldnt instantly freeze. In a vacuum, the only way to lose heat is by radiation (which occurs very slowly for a relatively cool object like a human body) or by evaporation of fluid. You would still die of course, but it would be by asphyxiation. Your blood holds enough oxygen for about 15 seconds of brain activity. After that youd black out, with complete brain death following within three minutes. But if you were rescued in the first 30 seconds, youd probably have nothing worse than love bite-type bruises over all your skin. Dont try to hold your breath before they throw you out though. The air in your lungs will cause your lung tissue to rupture quite abruptly as it expands into your chest cavity, forcing air bubbles into your bloodstream. This will be fatal even if you are subsequently rescued. Read more: Subscribe to BBC Focus magazine for fascinating new Q&As every month and follow @sciencefocusQA on Twitter for your daily dose of fun science facts.

What happens if you don't wear a spacesuit in space. What happens if you don't wear a spacesuit on the moon. What would happen if you go in space without a suit.