ESSENTIAL QUESTION:

Should we make a home in space?

There is much we don't know about the universe. Some people are eager to support further space exploration, whereas others would prefer to devote time and money to improving conidtions on our own planet. In this section, you will choose one additional selection about outer space for your final reading experience in this unit. Follow these steps to help you choose.

Look Back Think about the selections you have already read. What more do you want to know about outer space?

Look Ahead Preview the selections by reading the descriptions. Which one seems most interesting and appealing to you?

Look Inside Take a few minutes to scan through the text you chose. Make another selection if this text doesn't meet your needs.

Independent Learning Strategies

Throughout your life, in school, in your community, and in your career, you will need to rely on yourself to learn and work on your own. Review these strategies and the actions you can take to practice them during Independent Learning. Add ideas of your own for each category.

STRATEGY	ACTION PLAN
Create a schedule	• Understand your goals and deadlines. • Make a plan for what to do each day. •
Take notes	• Record important ideas and information. • Review your notes before preparing to share with a group. •
Practice what you've learned	• Use first-read and close-read strategies to deepen your understanding. • After you read, evaluate the usefulness of the evidence to help you understand the topic. • Consider the quality and reliability of the source. •

SCAN FOR MULTIMEDIA

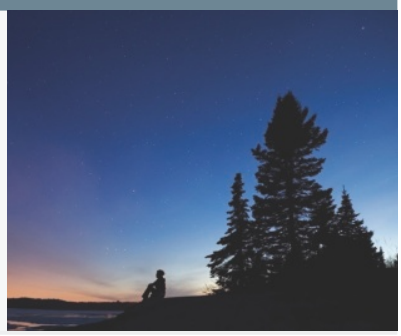
Choose one selection. Selections are available online only.

POETRY

Science-Fiction Cradlesong

C. S. Lewis

Where we end up might be the same as where we began.

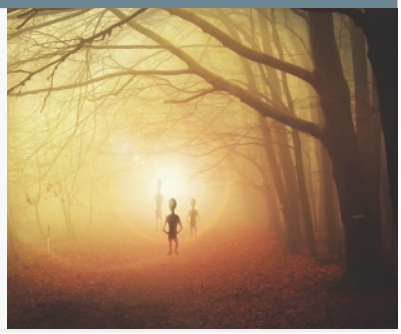


WEB ARTICLE

UFO Sightings and News

Benjamin Radford

Don't believe your eyes.



PERSUASIVE ESSAY

from Packing for Mars

Mary Roach

If it's out there, we should try to reach it.

SCIENCE ARTICLE

Trip to Mars Could Damage Astronauts' Brains

Laura Sanders

Great adventures involve great risks.

PERFORMANCE-BASED ASSESSMENT PREP

Review Evidence for an Argument

Complete your Evidence Log for the unit by evaluating what you've learned and synthesizing the information you've recorded.

SCAN FOR MULTIMEDIA

First-Read Guide

Tool Kit
First-Read Guide and Model Annotation

Use this page to record your first-read ideas.

Selection Title: _____

NOTICE

NOTICE new information or ideas you learn about the unit topic as you first read this text.

ANNOTATE

ANNOTATE by marking vocabulary and key passages you want to revisit.

CONNECT ideas within the selection to other knowledge and the selections you have read.

CONNECT

RESPOND by writing a brief summary of the selection.

RESPOND

STANDARD

Reading Read and comprehend complex literary and informational texts independently and proficiently.

Close-Read Guide

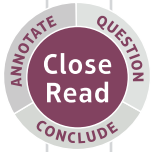
Tool Kit
Close-Read Guide and Model Annotation

Use this page to record your close-read ideas.

Selection Title: _____

Close Read the Text

Revisit sections of the text you marked during your first read. Read these sections closely and **annotate** what you notice. Ask yourself **questions** about the text. What can you **conclude**? Write down your ideas.



Analyze the Text

Think about the author's choices of patterns, structure, techniques, and ideas included in the text. Select one and record your thoughts about what this choice conveys.

QuickWrite

Pick a paragraph from the text that grabbed your interest. Explain the power of this passage.

STANDARD

Reading Read and comprehend complex literary and informational texts independently and proficiently.

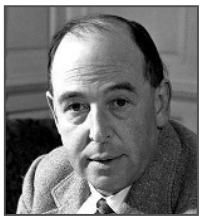
POETRY

Science-Fiction Cradlesong

C. S. Lewis

SCAN FOR MULTIMEDIA

Meet the Poet



C. S. Lewis (1898–1963) was an Irish author best known for his classic *Chronicles of Narnia,* a fantasy series about four young siblings and their adventures in the magical land of Narnia. He wrote more than thirty books, and most of his writings teach moral lessons. Lewis taught medieval literature at Oxford University and Cambridge University in England.

BACKGROUND

During the second half of C. S. Lewis's writing career, science fiction became more popular as the idea of space flight started to become a reality. The space age began in 1957, when the Soviet Union launched the first satellite into Earth's orbit. In 1961, Yuri Gagarin became the first man to travel into space.

NOTES

By and by Man will try
To get out into the sky,
Sailing far beyond the air
From Down and Here to Up and There.
Stars and sky, sky and stars
Make us feel the prison bars.

Suppose it done. Now we ride
Closed in steel, up there, outside;
Through our port-holes see the vast
Heaven-scape go rushing past.
Shall we? All that meets the eye
Is sky and stars, stars and sky.

Points of light with black between
Hang like a painted scene
Motionless, no nearer there
Than on Earth, everywhere
Equidistant[1] from our ship.
Heaven has given us the slip.

Hush, be still. Outer space
Is a concept, not a place.
Try no more. Where we are
Never can be sky or star.
From prison, in a prison, we fly;
There's no way into the sky.

1. **Equidistant** (ee kwuh DIHS tuhnt) *adj.* equally distant.

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WEB ARTICLE

UFO Sightings & News

Benjamin Radford

SCAN FOR MULTIMEDIA

About the Author

Benjamin Radford (b. 1970) is an American writer and investigator who serves as the deputy editor of *Skeptical Inquirer* magazine. He is a former co-host of *Monster Talk*, a podcast that examines the science and history of legendary creatures such as Bigfoot and werewolves. Radford is the author of several books and the creator of a board game. He writes about the paranormal, urban legends, and the explanations behind mysterious phenomenon.

BACKGROUND

A UFO, or "unidentified flying object," is an unusual light or object in the air that is difficult to explain. Some people believe that UFOs are intelligent aliens traveling in spaceships. From 1952 to 1969, the United States Air Force investigated about 12,000 reports of UFO sightings.

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1 *UFOs have fascinated and puzzled people for decades, yet hard evidence seems ever elusive. Many people are convinced that not only are extraterrestrials[1] visiting Earth, but that governments have perpetuated a top-secret global conspiracy to cover it up. Skeptic and UFO expert Benjamin Radford takes a look at the history and psychology of UFOs, including some of the most notable sightings.*

2 Today most people equate UFOs with extraterrestrial intelligence and advanced technologies, but this is a very recent idea. That's not to say that historically people did not report seeing unusual things in the skies, for they surely did: comets, meteors, eclipses, and the like had been reported (and sometimes recorded) for millennia. In fact some researchers believe that

1. **extraterrestrials** (ehks truh tuh REHS tree uhlz) *n.* creatures from another planet.

the Star of Bethlehem[2] may have been an illusion created by a merging of Jupiter and Venus in the sky, which occurred right around Jesus' birth.

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The First UFOs

3 But it's only been in the past century or so that anybody assumed that unknown lights or objects in the sky were visitors from other planets. Several of the planets had been noticed for millennia, but were not thought of as places where other living creatures might reside (for example, ancient Greeks and Romans thought the planets were gods).

4 Early science fiction writers like Jules Verne and Edgar Allan Poe fueled the public's interest in voyages to other worlds, and as technology developed some people began to wonder if that might not indeed be possible for advanced civilizations. The first reports of what could be called UFOs emerged in the late 1800s, though in those days they didn't use terms like "UFO" or "flying saucer," but instead "airships."

5 The most dramatic early UFO encounter occurred in 1897 in Texas, when E.E. Haydon, a newspaper reporter for the *Dallas Morning News,* described an amazing UFO encounter complete with a crashed spacecraft, dozens of eyewitnesses, a recovered dead Martian body, and metallic wreckage (fifty years later a nearly identical story would circulate about a crash in the neighboring state of New Mexico). The fantastic tale unraveled when researchers could find no eyewitnesses to support Haydon's story, and nothing of the alien nor the "several tons" of mysterious spacecraft wreckage was ever found. It turned out that Haydon had made the whole story up as a publicity stunt to attract tourists.

UFO Sightings

6 Early newspaper hoaxes[3] aside, there have been countless UFO reports over the decades, and a few of them stand out as especially important. The first report of a "flying saucer" only dates back to 1947 when a pilot named Kenneth Arnold reported seeing nine objects resembling boomerangs in the sky. He described their movement as "like a saucer if you skip it across the water," which a careless reporter misunderstood as saying that the objects themselves resembled "flying saucers," and that mistake launched many "flying saucer" reports in later decades.

2. **Star of Bethlehem** the Bible refers to an extremely large and bright "star" that appeared when Jesus Christ was born.
3. **hoaxes** (HOHK sis) *n.* untrue stories or tricks.

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Investigators believe that Arnold probably saw a flock of pelicans and misjudged their size, their large wings creating the "V" shape he described.

7 The most famous UFO crash allegedly occurred when something—skeptics say a top-secret spy balloon, believers say a spacecraft with alien pilots—crashed on a ranch in the desert outside of Roswell, New Mexico, in 1947, and the debate rages to this day.

8 The first UFO abduction[4] case—and to this day the most famous—was that of Barney and Betty Hill, an interracial couple who in 1961 claimed to have been chased down and abducted by a UFO. However, since there were no other eyewitnesses to the event and they didn't report the abduction at the time (only remembering it under hypnosis), many remain skeptical.

9 Another famous UFO sighting occurred near Phoenix, Arizona, in March 1997 when a series of bright lights were reported in the night skies. Though it is known that the military dropped flares over a nearby proving ground during routine exercises around the time of the sightings, UFO buffs[5] dismiss the government's explanation of the lights and insist there's more to the story.

10 Since then, a host of UFO sightings have been reported. Here are a handful in recent years that got a lot of attention:

11 **Jan. 7, 2007:** Strange lights over Arkansas fueled much speculation on the internet until the Air Force debunked the UFO claims, explaining that flares had been dropped from airplanes as part of routine training.

12 **April 21, 2008:** Phoenix lights were reported again. It was a hoax, created by road flares tied to helium balloons. The hoaxer admitted it, and eyewitnesses reported seeing him do it.

13 **Jan. 5, 2009:** New Jersey UFOs that proved so baffling they were reported on the History Channel turned out to be helium balloons, red flares and fishing lines, all part of a social experiment. The men who perpetrated the hoax, Joe Rudy and Chris Russo, were fined $250 for creating what could have been a danger to the nearby Morristown airport.

14 **October 13, 2010:** UFOs over Manhattan turned out to be helium balloons that escaped from a party at a school in Mount Vernon.

4. **abduction** *n.* kidnapping.
5. **buffs** *n.* knowledgeable fans.

15 **Jan. 28, 2011:** Videos of UFOs hovering over the Holy Land (the Dome of the Rock on Jerusalem's Temple Mount) were revealed as a hoax—the effects of video editing software's use were discovered.

16 **July 2011:** The sighting of a UFO on the ocean floor was attributed to a Swedish scientist, but that researcher, Peter Lindberg, merely said the thing he detected in blurry images was "completely round," an assertion not supported by the low-resolution sonar image. A second "anomaly" made the case seem even more bizarre, but no evidence has emerged to suggest alien origin.

17 **April 2012:** A UFO near the sun, spotted in a NASA image, turned out to be a camera glitch.

18 **April 2012:** A viral UFO video taken from a plane over South Korea likely showed a droplet of water on the airplane's window.

19 **May 2012:** A nephew of the famous Wayans brothers comedy team, Duayne "Shway ShWayans" Wayans, filmed a UFO over Studio City, Calif. But like many, many UFO sightings, this one turned out to be the planet Venus. In fact, Venus has been mistaken for a UFO even by airline pilots.

UFO Psychology

20 It's not hard to understand why there are so many UFO sightings. After all, the only criterion for a UFO is that some flying object be unidentified by whoever is looking at it at the time. Any object seen in the sky, especially at night, can be very difficult to identify because of the limitations of human perception. Knowing how far away something is helps us determine its size and speed; that's why we know that moving cars seen at a distance aren't really smaller, nor are they moving slowly; it's simply an optical illusion. If the eyewitness doesn't know the distance, then he or she cannot determine the size. Is that thing or light in the sky twenty feet long and 200 yards away, or is it 200 feet long and a mile away? It's impossible to know, and this makes estimates of size, distance and speed of UFOs very unreliable.

21 Psychologists also know that our brains tend to "fill in" missing information, which can mislead us. For example, many sightings of three lights in the night sky are reported as appearing as a triangular spacecraft. The fact is that any three lights in the sky, whether connected or not, will form a triangle if you assume

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(without evidence) that each of those lights are fixed at the ends of three points. Had a witness seen four lights he or she would have assumed it was a rectangular-shaped object in the night sky above him; our brains sometimes make connections where none exist.

22 All that is needed to create a UFO sighting is one person who may not recognize a light or object in the sky. But just because one person—or even several people—can't immediately identify or explain something they see doesn't mean that someone else with more training or experience (or even the same person seeing the same object from a different angle) may not instantly recognize it. While it's possible that extraterrestrials in spacecraft exist and have visited Earth, the UFO sightings so far provide no real evidence. The lesson, as always, is that "unknown lights in the sky" is not the same as "extraterrestrial spacecraft." ❧

PERSUASIVE ESSAY

from Packing for Mars

Mary Roach

About the Author

Mary Roach (b. 1959) grew up in New Hampshire. After graduating from Wesleyan University, she pursued a career in writing. She has written for *Wired, National Geographic*, and the *New York Times Magazine*, and is known for her popular science books.

SCAN FOR MULTIMEDIA

BACKGROUND

It was in 1783 that people first took to the sky on a hot-air balloon designed by the Montgolfier brothers. In 1903, the Wright brothers took flight in the first powered airplane. And in 2000, the first crew arrived to take up residence on the International Space Station. Today, people are contemplating the first manned mission to Mars.

1 The tougher question is not "Is Mars possible?" but "Is Mars worth it?" An outside estimate of the cost of a manned mission to Mars is roughly $500 billion. What good will come of sending humans to Mars, especially when robotic landers can do a lot of the science just as well, if not as fast? I could parrot the NASA Public Affairs Office and spit out a long list of products and technologies spawned by aerospace innovations over the decades. Instead, I defer to the sentiments of Benjamin Franklin.[1] Upon the occasion of history's first manned flights—in the 1780s, aboard the Montgolfier brothers' hot-air balloons—someone asked Franklin what use he saw in such frivolity.[2] "What use," he replied, "is a newborn baby?"

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1. **Benjamin Franklin** (1706–1790) American author, scientist, and statesman who was famous for his inventions.
2. **frivolity** (frih VOL uh tee) ***n.*** silly behavior.

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2 It might not be that hard to raise the funds. If the nations involved were to approach their respective entertainment conglomerates,[3] an impressive hunk of funding could be raised. The more you read about Mars missions, the more you realize it's the ultimate reality TV.

3 I was at a party the day the Phoenix robotic lander touched down on Mars. I asked the party's host, Chris, if he had a computer I could use to watch the NASA TV coverage. At first it was just Chris and I watching. By the time *Phoenix* had plowed intact through the Martian atmosphere and was about to release its parachute for the descent, half the party was upstairs crowded around Chris's computer. We weren't even watching *Phoenix*. The images hadn't yet arrived. (It takes about twenty minutes for signals to travel between Mars and Earth.) The camera was trained on Mission Control at the Jet Propulsion Laboratory. It was standing room with engineers and managers, people who'd spent years working on heat shields and parachute systems and thrusters, all of which, in this final hour, could fail in a hundred different ways, each of those failures having been planned for with backup hardware and contingency software. One man stared at his computer with the fingers of both hands crossed. The touchdown signal arrived, and everyone was up on their feet making noise. Engineers bear-hugged each other so enthusiastically that they knocked their glasses crooked. Someone began passing out cigars. We all yelled too and some of us got a little choked up. It was inspiring, what these men and women had done. They flew a delicate scientific instrument more than 400 million miles to Mars and set it down as gently as a baby, exactly where they wanted it.

4 We live in a culture in which, more and more, people live through simulations. We travel via satellite technology, we socialize on computers. You can tour the Sea of Tranquility on Google Moon and visit the Taj Mahal via Street View.[4] Anime fans in Japan have been petitioning the government for the right to legally marry a two-dimensional character. Fundraising has begun on a $1.6 billion resort in the rim of a simulated Martian crater in the desert outside Las Vegas. (They can't simulate Martian gravity, but the boots of the spacesuits will be "a little more bouncy.") No one goes out to play anymore. Simulation is becoming reality.

5 But it isn't anything like reality. Ask an M.D.[5] who spent a year dissecting a human form tendon by gland by nerve, whether learning anatomy on a computer simulation would be comparable. Ask an astronaut whether taking part in a space

3. **conglomerates** (kuhn GLOM uhr ihts) *n.* large groups of companies.
4. **Google Moon . . . Street View** technology that displays photographic views of the moon and streets around the world respectively.
5. **M.D.** *abbrev.* medical doctor.

simulation is anything like being in space. What's different? Sweat, risk, uncertainty, inconvenience. But also, awe. Pride. Something ineffably[6] splendid and stirring. One day at Johnson Space Center, I visited Mike Zolensky, the curator of cosmic dust and one of the caretakers of NASA's meteorite collection. Every now and then, a piece of asteroid slams into Mars hard enough that the impact hurls small chunks of the Martian surface way out into space, where they continue to travel until they are snagged by some other planet's gravitational pull. Occasionally that planet is Earth. Zolensky opened a case and lifted out a Martian meteorite as heavy as a bowling ball and handed it to me. I stood there taking in its hardness and heft, its *realness*, making an expression that I'm sure I'd never before had call to make. The meteorite wasn't beautiful or exotic-looking. Give me a chunk of asphalt and some shoe polish and I can make you a simulated Mars meteorite. What I can't possibly simulate for you is the feeling of holding a 20-pound divot of Mars in your hands.

6 The nobility of the human spirit grows harder for me to believe in. War, zealotry, greed, malls, narcissism. I see a backhanded nobility in excessive, impractical outlays of cash prompted by nothing loftier than a species joining hands and saying "I bet we can do this." Yes, the money could be better spent on Earth. But would it? Since when has money saved by government redlining[7] been spent on education and cancer research? It is always squandered. Let's squander some on Mars. Let's go out and play. ❧

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6. **ineffably** (ihn EHF uh blee) *adv.* unable to describe in words.
7. **government redlining** practice of denying services, such as insurance coverage or mortgage loans.

SCIENCE ARTICLE

Trip to Mars Could Damage Astronauts' Brains

Laura Sanders

SCAN FOR MULTIMEDIA

About the Author

Laura Sanders is a staff writer for *Science News* magazine. As a neuroscience writer, she makes use of her Ph.D. in molecular biology as well as her undergraduate degree in creative writing. Sanders's research has been published in *Current Biology, Developmental Biology,* and other scientific journals.

BACKGROUND

Created in 1958, the National Aeronautics and Space Administration (NASA) has become a leader in space research and space exploration. Through NASA, the United States has flown people into orbit and ultimately to the moon. NASA has also sent research spacecraft to study planets and other celestial objects in our solar system.

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1 Particles[1] zipping through space could be the wrong stuff for Mars astronauts.

2 A study using mice found these high-energy particles slice through the brain. They pruned back connections linking brain cells. This left the animals with memory and learning problems. The study's authors now worry that astronauts could suffer similar effects on long missions outside Earth's protective atmosphere. One example: traveling to Mars.

3 The new findings are "worrisome, very worrisome," says M. Kerry O'Banion. As a neuroscientist he studies how the brain works. O'Banion works at the University of Rochester Medical Center in New York.

4 The explosion of massive stars creates cosmic rays. This energetic radiation consists of electrically charged particles.

1. **particles** *n.* tiny amounts of something.

Traveling through space at nearly the speed of light, this radiation would bombard a spacecraft and its astronauts. For how long? Well, a human mission to Mars could last between one and three years, the National Aeronautics and Space Administration estimates.

6 Charles Limoli works at the University of California, Irvine. For his team's new study, the scientists beamed mice with high-energy charged particles. The idea was to simulate cosmic rays in space.

7 Six weeks later, the mice showed memory problems. They had a harder time recognizing new toys than did unzapped mice. They also did a poorer job of remembering where a toy had been. Details appeared May 1 in *Science Advances*.

8 Visible brain damage also showed up. The radiation shortened the complex branches on nerve cells that receive messages. It also left these brain cells with fewer branches, the team found. "We weren't expecting such dramatic effects from these charged particles," says Limoli.

Translating the Findings to People

9 These findings suggest Mars astronauts, too, might suffer brain problems. And such effects could emerge while they were still in space. "Over the course of a long-term mission, this may become very problematic," Limoli says. It could affect how well people perform on missions, including how quickly and how well they make decisions. Brain impacts also might persist even after they got back home.

10 Translating these data to people, however, is difficult, O'Banion says. "There are big differences in the way the animals are exposed to the radiation versus how astronauts are," he points out. Space also holds a more complex mixture of particles than those in the test beam. The doses differ too. So a lot remains unknown about how the human body and brain will respond to such radiation, he says.

11 Still, Limoli's team observes, "Our data indicate an unexpected and unique susceptibility of the [brain] to space radiation." And this argues that space radiation could impair the ability of astronauts to perform critical tasks, the scientists say.

12 NASA wants to send astronauts to Mars by the 2030s. Learning more about cosmic rays may help scientists create better ways to protect those astronauts. Adding shielding to a spacecraft is one solution. However, shielding adds weight. And that makes a spacecraft more expensive and more difficult to launch. ❧

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