

- Mark your confusion.
- Purposefully annotate the article (1-2 mature, thoughtful responses per page to what the author is saying)
- Write a 250+ word response to the article.

(If you are a teacher or student who would like to modify this Google Doc, go to File > Make a Copy. I cannot and do not respond to Share requests -- my apologies!)

## SpaceX launches Tesla Roadster sports car into orbit toward Mars

By Newsela Staff, adapted from *Washington Post*, 2-9-18

KENNEDY SPACE CENTER, Florida — On Tuesday, February 6, the private company SpaceX successfully launched what is now the world's most powerful rocket. Named the Falcon Heavy, the rocket is a towering giant. It tore through the sky with the power of eighteen 747 airplanes.

Liftoff took place from the same launchpad that sent the crew of Apollo 11 to the moon. The Falcon Heavy sent up a mountain-sized plume of smoke and a rattling roar across Florida's Space Coast, where thousands gathered to watch. The mission represented the first test of the massive rocket. It is powered by 27 engines in three boosters that are essentially strapped together.

### **A Rocket With A Roadster Strapped To The Roof**

The launch also marked the first time a privately financed rocket, rather than one made by NASA, ever attempted to propel its cargo into orbit. NASA is part of the government, whereas SpaceX is a private company. As a promotional stunt, SpaceX founder Elon Musk loaded the Falcon Heavy with his own cherry-red Tesla Roadster. The car was built by another one of his companies. He said he planned to send the Tesla into an orbit that would take it near Mars.

It was a beautiful day for a launch with clear blue skies and a slight breeze. Warm weather attracted space fans by the thousands who lined the beaches and side roads in anticipation.

"You can feel the energy," said Dale Ketcham, an executive at Space Florida, which seeks to boost the state's role in air and space technologies. "It's been a long time since we had so much enthusiasm. And everyone and their brother is trying to remember whatever favor they might have done for us to get a pass."

If SpaceX can fly the Falcon Heavy reliably, the rocket could prove useful to the military for launching national security satellites. It could also aid NASA's human exploration goals. SpaceX says the rocket is capable of hauling more mass farther than any existing rocket. The company estimates that it can carry 140,000 pounds to low Earth orbit and nearly 40,000 pounds to Mars.

### **A Revival Of The Exploring Spirit**

Space travel experts, though, say there are some concerns about how useful the Falcon Heavy will be. SpaceX had been planning to fly a pair of tourists around the moon as early as this year. On Monday, Musk went back on his word. He said the Falcon Heavy likely would never propel humans into space. The company is now shifting its focus to its next-generation rocket, known as the "BFR," or "Big Falcon Rocket."

Still, the Falcon Heavy's successful launch represents a "revival of the exploring spirit," said John Logsdon. He is a space historian and professor at George Washington University.

NASA ended its space shuttle program in 2011. Since then, missions have been limited to what is known as low Earth orbit. These include missions to the International Space Station, which flies at about 250 miles above the surface of the earth.

The Falcon Heavy, though, represents a chance to go beyond that into deep space, to "push the frontier," Logsdon said. "This really gives us a capability that this country has not had since the last Saturn V flight, which was in 1973."

### **Reminiscent Of The Apollo Era**

The Apollo-era Saturn V rockets were more powerful than the Falcon Heavy, but they are no longer in use. The Falcon Heavy is one of a series of large rockets that are under development and set to launch in the

next few years. The United Launch Alliance, the partnership between aerospace companies Boeing and Lockheed Martin, is developing its Vulcan rocket. Blue Origin, the space company started by Amazon.com founder Jeff Bezos, is also building a massive rocket. The rocket is called New Glenn. Its name honors astronaut John Glenn. He was the first American to orbit the earth.

SpaceX's launch comes as the Trump administration is focused on returning to the moon. While it has not released details of how or at what cost, officials support having NASA do so in partnership with commercial companies such as SpaceX. These privately owned companies are trying to make space travel far more affordable than it has been in the past.

Commerce Secretary Wilbur Ross, a member of the revived National Space Council, was on hand Tuesday to view the launch. He praised SpaceX's efforts to bring rocket launches back to the United States. He added that the council wants to make space travel available to consumers soon. "We're moving quite aggressively to try to accomplish that."

### **How To Proceed?**

SpaceX's successful launch raises questions for NASA about how best to proceed. For years, the space agency has been working to develop the Space Launch System. It would be an even more powerful rocket than the Falcon Heavy, but at about \$1 billion per launch, it is many times more expensive. Ross said there is room for both systems.

"Space is a big, big thing," he said.

## **Musk's plan: send 1 million people to Mars and start a new civilization**

By Hannah Devlin, *The Guardian*, adapted by Newsela staff, 06/22/2017

As far as home planets go, Earth ticks most of the boxes: oxygen, water, food and lovely views. But there are risks to be considered, too. What if a nuclear war, an asteroid collision or other disaster sent it all up in smoke, ending our own fragile existence?

Elon Musk is one step ahead. Last year he outlined his ambition to send humans to Mars as a "backup drive" for civilization. Now, the billionaire businessman has provided further details of his vision to make humans a multi-planetary species in a breezy paper, published in the journal *New Space*.

Musk is the founder and CEO at Space Exploration Technologies, known as SpaceX. He oversees the manufacturing of rockets and spacecraft, says the SpaceX website.

His paper outlines early designs of the gigantic spacecraft, designed to carry 100 passengers, that he hopes to construct.

### **Do You Want To Be One In A Million?**

"The thrust level is enormous," the paper states. "We are talking about a lift-off thrust of 13,000 tons, so it will be quite tectonic when it takes off."

Creating a self-sustained civilization of around 1 million people – the ultimate goal – would take 40 to 100 years, according to the plans. Before full colonization takes place, though, Musk needs to get the first pioneers to pave the way.

The current situation is summed up in a Venn diagram showing two non-intersecting circles representing, on one side, the kind of people who would actually get on the Mars rocket and, on the other, those who could afford this kind of adventure. One estimate of the current cost is put at \$10 billion per person.

"What we need to do is to move those circles together," Musk explains. If the mission cost could be dropped to the cost of an average U.S. house price, Musk predicts people would start to sign up in big enough numbers. He thinks they'd be attracted by the opportunity to be among the first to live on the red planet. "Given that Mars would have a labor shortage for a long time, jobs would not be in short supply," he points out.

### **The Moon And Venus Don't Make The Cut**

The paper strikes a buoyant, even humorous tone and doesn't get excessively bogged down in technical detail. One section, titled "Why Mars," spells out that the Red Planet is essentially the best of a bad lot.

“Venus is a high-pressure – super-high-pressure – hot acid bath ... not at all like the goddess,” Musk writes. “So, it would be really difficult to make things work on Venus.”

The moon is dismissed because it would be too small for the overarching vision. “I actually have nothing against going to the moon, but I think it is challenging to become multi-planetary on the moon because it is much smaller than a planet.”

“It would be quite fun to be on Mars because you would have gravity that is about 37 percent of that of Earth, so you would be able to lift heavy things and bound around,” he adds. He predicts that journey times could eventually be cut to 30 days.

“In some ways, it is not that complicated,” Musk said of the spaceship’s design. Critics might point out that runs contrary to the reputation of this field of science.

### **Right Now The Trip Is A Little Pricey**

Financially, there are some challenges ahead, the paper acknowledges. “We have to figure out how to improve the cost of trips to Mars by 5 million percent.”

However, Musk has some ideas for how such tremendous savings might be achieved. Reusing rockets could reduce the cost of spaceflight one thousandfold and refilling fuel in orbit rather than landing could make considerable savings too.

Space scientists remain skeptical about the vision, however.

In a recent interview, Ellen Stofan, former NASA chief scientist, dismissed the idea that there would ever be a mass transfer of humans to another planet, adding that trumpeting the idea risked being a distraction from the problems faced on our home planet. “I don’t see a mass transfer of humanity to Mars, ever,” she said. “Job one is to keep this planet habitable. There isn’t a planet B.”

### **Let's Focus On Saving Earth First**

Commenting on Twitter, Mark McCaughrean, senior adviser for science and exploration at the European Space Agency, struck a combative tone. “It’s a wild-eyed investment pitch, pumped up by the enthusiasm of credulous fanboys brought up on comic book sci-fi,” he tweeted in response to the paper. It’s wrapped in a zeal for “saving humanity from itself and the problems we’ve wrought on this planet,” he said in the same tweet.

“I’m less concerned about making humans a multi-planetary species than I am about making the Earth a sustainable multi-species planet,” he added.

Professor Andrew Coates, who works on the ExoMars rover at University College London’s Mullard Space Science Laboratory, said that the question of whether present or past life existed on Mars needed to be answered before a manned mission, which could contaminate the surface, could take place. He said keeping Mars untouched for now is a moral obligation. “Until we’ve conclusively answered that question we should keep our feet on the ground,” he said. Putting humans on Mars would be a type of vandalism, he added.

And what is the timeline for the project? Musk states that he is being “intentionally fuzzy” about when the vision might become a reality. He has noted that the first flights could start as early as 2023, though. “If things go super-well, it might be in the 10-year time frame, but I do not want to say that is when it will occur,” the paper said.

### **Response Options:**

- In what ways is Elon Musk trying to change the world for the better?
- What do you find most fascinating about either article?
- What is one “life lesson” you take from Musk? How could Musk’s life apply to yours?