How to Make a Spaceship
A Band of Renegades, an Epic Race, and the Birth of Private Spaceflight

"If you admire those who aim really high, How to Make a Spaceship belongs on your bookshelf." —THE WALL STREET JOURNAL
PRAISE FROM EDUCATORS

“How to Make a Spaceship is magical for young people. Julian Guthrie has shown to students of all ages, abilities and socioeconomic levels the awesomeness of what can be created using science, technology, engineering and math – along with skill and teamwork. This story is about following one’s passion and having the grit and determination to realize a goal and dream.”
—Erin McCallum, President, Washington FIRST Robotics

“How to Make a Spaceship is not only a fascinating book about extraordinary pioneers, it’s an inspiration for today’s students. Julian Guthrie captures the imagination of children and adults of all ages, and her book drives home the importance of hands-on STEM learning and the ability of role models and heroes to inspire us to make the impossible a reality.”
—Dr. Lorna Finman, CEO, STEM Revolution, CEO, LCF Enterprises

“Imagine a book that inspires young people to dream about going into space and accomplishing difficult challenges. How To Make A Spaceship is changing lives! Our high school’s CubeSat team members agree that How To Make A Spaceship is the best nonfiction book they have ever read—so motivating, in fact, that one girl changed her career goal to aerospace. As an educator for over 35 years, I have never found a book that so inspires my students, especially in STEM learning.”
—Beth Brubaker, North Idaho STEM Charter Academy, Project DaVinci CubeSat Educational Lead

“Julian Guthrie weaves an incredible story that is as rich in content as it is exhilarating in tone. As students take flight with these real-life American heroes, they will be exposed to science, engineering, entrepreneurship, and history - all wrapped up in a fast-moving narrative that will have them craving more. While there is a bevy of STEM education materials on the market today, the fascinating story of those who’s wild dreams and fearless actions make STEM a reality is perhaps the greatest lesson available for today’s students.”
—Mike Russo, Entrepreneurship Instructor, Kern High School District

WHAT OTHERS ARE SAYING ABOUT HOW TO MAKE A SPACESHIP

“If you admire those who aim really high, How to Make a Spaceship belongs on your bookshelf. [It] offers a rousing anthem to the urge to explore.”
—Wall Street Journal

“Guthrie has a gift of building suspense around these airborne incidents of inherent drama—such as a balloon flight gone wildly wrong that ends in a botched parachute jump—as well as larger questions about space, technology
and life’s purpose . . . How to Make a Spaceship is . . . ultimately flight-worthy and impressively ambitious. When the history of 21st century American space efforts is written decades or centuries from now, this book will be a valuable contemporary record of what it was like when humanity was trying to break out of its home.” —San Francisco Chronicle

“[How to Make a Spaceship] reads like a thriller. The story sounds incredible, as if torn from the pages of science fiction. And it has a happy ending. But as with all entrepreneurial ventures, nothing went according to plan: It was riddled with failure and disappointment; ugly battles broke out between friends and founders; the world often looked like it was coming to an end; and Diamandis had to gamble everything he had.” —Vivkek Wadhwa, Washington Post

“[How to Make a Spaceship] includes enough death-defying stunts, madcap schemes, wild coincidences, and rousing redemptive moments to fuel a dozen Hollywood blockbusters.” —Wired.com

“Ms. Guthrie’s tale is sometimes tragic, but ultimately it is an uplifting one that will appeal to adventure junkies as well as to those who prize free-market solutions to monumental challenges.” —Wall Street Journal

“If readers are looking for scientific discussions, humorous anecdotes, and intense action, Guthrie covers those. The flights are written to make readers feel like they’re experiencing them in real time, nerves and all.” —Publishers Weekly

“Engaging… Just the thing for aspiring astronauts and rocketeers.” —Kirkus

“I don’t know how Julian Guthrie does it. In her last book, she didn’t race in the America’s Cup, yet readers felt they had. And now in How to Make a Spaceship, although she wasn’t strapped into the cockpit of the first civilian spacecraft to rocket into outer space, her vivid writing places readers right there. With the flair of a novelist and the precision of a fine journalist, she takes readers on a journey not just into space but into the hearts and minds of the adventurers who dare go where NASA no longer does. Her tale will quicken your pulse.” —Ken Auletta, author of Googled: The End of the World as We Know It

“The story of Peter Diamandis is a reminder of the power of passion and persistence. How to Make a Spaceship chronicles the amazing journey of a key figure in the private race to space—a dreamer who, in the face of multiple setbacks and naysayers, simply refused to let go of his dream.” —Arianna Huffington, author, cofounder of The Huffington Post
“Too few kids and young adults understand the power of science and technology. We need role models demonstrating the power of passion and perseverance to make dreams come true. How to Make a Spaceship is filled with innovators and doers. The story will inspire makers of all ages.”
—Dean Kamen, inventor, entrepreneur, founder of FIRST Robotics

“This incredible book is The Right Stuff with afterburners. Intrepid designers and innovators risk their reputations. Gutsy test pilots risk their lives. Explorers push new boundaries of what so many once thought was impossible. All brought together by a real gravity-defying force, Peter Diamandis. How to Make a Spaceship is required reading for anyone who cares about space, aviation, and the future of flight.”
—Captain Mark Kelly (USN, Ret.), former naval aviator, test pilot, and NASA astronaut

“This outstanding and compelling book shows the power of one man’s vision, and the ability of small teams to accomplish extraordinary things. How to Make a Spaceship will inspire and guide you to take on your own Moonshot.”
—Ray Kurzweil, Inventor, Author, Futurist and Chancellor, Singularity University

ABOUT THE AUTHOR

Julian Guthrie spent 20 years at the San Francisco Chronicle, where she won numerous awards – the Society of Professional Journalists Public Service Award, the Best of the West, and more – and had her writing nominated multiple times for a Pulitzer Prize. She is the proud author of three nonfiction books: The Grace of Everyday Saints; The Billionaire and The Mechanic; and How to Make a Spaceship.

How to Make a Spaceship was published in hardcover in Sept. 2016 and garnered both strong reviews and accolades. The paperback release is Sept. 2017. Here are a few of the book’s accolades:

- A New York Times best-seller
- A Forbes “Top Ten Technology books from 2016”
- An Amazon best book of September 2016
- A Smithsonian magazine “Best Books about Innovation”
- A Geekwire “Top Ten Books for Geeks”
- A LinkedIn Top book of 2016
- Shortlist finalist for the PEN/E.O. Wilson Literary Science Writing Award
Guthrie is drawn to stories with an underdog theme. In the case of her first book, *The Grace of Everyday Saints*, a small group of lifelong Catholics spend more than a decade battling the Catholic Church to have their historic parish reopened. They wage an unlikely crusade— the longest parish protest in Catholic America—that takes them to the Vatican. Pulitzer Prize-winning author T.J. Stiles wrote: “A vivid, compassionate, beautifully told account of the battle waged by the men and women of a historic San Francisco parish.” Guthrie’s second book, *The Billionaire and The Mechanic* is the story of Oracle co-founder Larry Ellison and his unlikely partnership with a radiator repairman, who is head of a blue-collar boating club, to win the oldest trophy in international sports, the America’s Cup, and bring it back to the United States. Ken Auletta wrote, “Julian Guthrie writes so vividly that the reader is held spellbound, from page one to the end.” Guthrie’s third book, *How to Make a Spaceship*, is the story of a group of dreamers and mavericks who banded together to build and fly a manned rocket to the start of space without the government’s help, ushering in the commercial space industry of today.

**MORE ABOUT THE BOOK**

**The historic race that reawakened the promise of manned spaceflight**

Alone in a Spartan black cockpit, test pilot Mike Melvill rocketed toward space. He had eighty seconds to exceed the speed of sound and begin the climb to a target no civilian pilot had ever reached. He might not make it back alive. If he did, he would make history as the world’s first commercial astronaut.

The spectacle defied reason, the result of a competition dreamed up by entrepreneur Peter Diamandis, whose vision for a new race to space required small teams to do what only the world’s largest governments had done before.

Peter Diamandis was the son of hardworking immigrants who wanted their science prodigy to make the family proud and become a doctor. But from the age of eight, when he watched Apollo 11 land on the Moon, his singular goal was to get to space. When he realized NASA was winding down manned space flight, Diamandis set out on one of the great entrepreneurial adventure stories of our time. If the government wouldn’t send him to space, he would create a private space flight industry himself.

In the 1990s, this idea was the stuff of science fiction. Undaunted, Diamandis found inspiration in an unlikely place: the golden age of aviation. He discovered that Charles Lindbergh made his transatlantic flight to win a $25,000 prize. The flight made Lindbergh the most famous man on earth and galvanized the airline industry. Why, Diamandis thought, couldn’t the same be done for space flight?
The story of the bullet-shaped SpaceShipOne, and the other teams in the hunt, is an extraordinary tale of making the impossible possible. It is driven by out-sized characters—Burt Rutan, Richard Branson, John Carmack, Paul Allen—and obsessive pursuits. In the end, as Diamandis dreamed, the result wasn’t just a victory for one team; it was the foundation for a new industry and a new age.

**CHARACTERS**

**Peter Diamandis**—the protagonist, dreams of getting to space without the government’s help.

**Burt Rutan**—an aviation designer who sets out to make the world’s first private spaceship.

**Erik Lindbergh**—the grandson of famed aviator Charles Lindbergh and Anne Morrow Lindbergh, who struggles to find his own identity.

**Anousheh Ansar**—born in Iran, dreams of space, becomes a successful engineer and entrepreneur before risking everything for her dream.

**Dick Rutan**—older brother of Burt Rutan, decorated military test pilot and history making maverick pilot.

**Mike Melvill**—South African who drops out of high school, is a self-taught machinist, takes up piloting mid life, only to try to do the impossible in the Mojave Desert.

**Brian Binnie**—a straight-laced Navy pilot and Princeton aerospace engineer who seeks redemption in a homebuilt spacecraft.

**Steve Bennett**—Gives up his steady job working in a Colgate factory in England to try to win Peter Diamandis’ $10 million XPRIZE.

**Dumitru Popescu**—An aerospace engineering student in Romania drops out of school to become a contender for the XPRIZE.

**Pablo DeLeon**—An Argentine space researcher and dreamer who faces ridicule from colleagues when he decides to go after the XPRIZE.

**John Carmack**—a famous programmer of video games turns his skills to rockets.

**Elon Musk**—His dream of a private path to space begins around year 2000, when he meets for the first time with Peter Diamandis.

**Jeff Bezos**—He is the president of the Princeton chapter of Students for the Exploration and Development of Space (SEDS), a national group founded by Diamandis while at MIT.
Richard Branson—the founder of the Virgin Group, a self-made billionaire who will say no to Peter Diamandis’ dream twice before making it a reality in unimagined ways.

CHAPTER ONE: UNRULY

In this chapter we meet a young Peter Diamandis, the book’s protagonist, and we learn even from an early age what makes him tick. In this class we will read about, listen to, and meet many entrepreneurs. You should always be seeking insights into their passions and curiosities and be greeting these insights with passions and curiosities of your own. Also think about how hands-on STEM learning (science, technology, engineering, and math) came to play an all-important role in their lives.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. Peter Diamandis -
   b. NASA -
   c. Neil Armstrong -
   d. Buzz Aldrin -
   e. Apollo 11 -

1. The story begins in 1969 with Peter Diamandis in 3rd grade. His Greek mother called him ataktos. What does that word mean? Why do you think that might be a GOOD characteristic for someone who will someday start his own businesses?

Answer:

2. Peter’s dad, Harry, was an immigrant to America. Although he became a doctor rather than a small-business owner, how were some of Harry’s experiences and characteristics similar to the experiences of someone starting a new business?

Answer:

3. Peter’s family wanted him to become a doctor rather than an astronaut. What reasons are stated and implied for this wish?

Answer:

4. By 1974, Peter was in eighth grade. This boy who loved space has already seen numerous rocket launches to the Moon and now begins to hear of plans for a space shuttle. Why do you think the author states that “in Peter’s mind, NASA could do no wrong”?

Answer:
5. Peter’s first start-ups are The Everything Club – founded with his school and neighborhood pals to fund their hobbies, such as robots and rockets – and school organizations. In what ways is he already doing things that a small-business person must do?
Answer:

6. Your question related to the story or entrepreneurship for the author.
Answer:

**CHAPTER TWO: EARLY REGRETS**

This chapter begins with an unhappy Peter at Hamilton College as a pre-med student, per his family’s wishes. We also see NASA, with whom Peter used to think could do no wrong, starting to cut back on its vision for space. Despite both, Peter remains focused on his goals. Peter is not in control of his family or NASA, but he is in control of how he reacts to them. For an entrepreneur, oftentimes you are the **only one** who can clearly see the future you’ve laid out, when this happens, focus, hard work, learn from mistakes, and preserve.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
a. MIT -

1. Entrepreneurs are hungry for information and knowledge. Even at 18 years of age, Peter is going to “science-related talks from visiting professors”, starting a biology study group, seeking out professors and local authors with connections to space, and writing letters to NASA. What things can YOU do **today** to gain information and knowledge about the things you care about?
Answer:

2. The paragraph on page 33 that begins “Draper could not have known…” contains great truths for entrepreneurs, including the need to forge into the unknown and the value of competition. In your own words, comment briefly on this paragraph as it relates to entrepreneurs.
Answer:

3. Learning from your mistakes is critical, but one can also learn from other’s mistakes. What lessons can you take from Peter’s stolen pig story?
Answer:

4. Your question related to the story or entrepreneurship for the author.
Answer:
CHAPTER THREE: PETE IN SPACE

Now at MIT, Peter is extremely busy taking both pre-med AND astrophysics classes. This is the early 1980s and NASA is working with MIT and others on the new space shuttle program. Peter’s entrepreneurial spirit continues to grow as he starts a multi-national space organization for college students.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Cadence -
b. Pitch (as in ‘sales pitch’) -
c. Vienna -
d. Arthur C. Clarke -
e. Risk Averse -

1. Every startup needs a vision statement to provide clarity to leaders, workers, and the public/customer. What is Peter’s vision for SEDS (top of page 41)?
   Answer:

2. There are many ways to grow and expand a business. What way did Peter use to grow his SEDS club from MIT, where he started it, to other schools, first at Princeton and Yale, and then others? What lesson can you take from this?
   Answer:

3. Page 43: “Peter had a hard time actually asking for the money. He feared rejection.” How could these two sentences have ended this book as a fanciful dream that died in 1982? In other words, why does fear of rejection kill the entrepreneurial spirit? (Spoiler alert: Peter gets over this fear BIG TIME, and that is much of why we are reading this book.)
   Answer:

4. Well that didn’t take long. Also on page 43 Peter is told “no” by the Draper Lab, rather than walk out and feel sorry for himself, he makes follow-up requests. What does he ask for?
   Answer:

5. Peter is quickly learning that rejection will prevent his dream from becoming a reality. After the world-famous author and futurist Arthur C. Clarke walks away from him the first time, what does Peter do later in the day? How does the evening end?
   Answer:

6. “NASA is risk averse” Peter is told when he mentions a problem with his eyes. This means that he will never get to space with the government’s help. Rather than give up his dream, what thoughts go through Peter’s entrepreneurial mind?
   Answer:
CHAPTER FOUR: MOJAVE MAGIC

This book tells three stories which eventually intersect. In this chapter we are introduced to Dick and Burt Rutan (the protagonist of the second story) and their friends Mike and Sally Melvill. This is also where the Voyager aircraft becomes the “last first in aviation”.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Voyager (airplane) -

b. Charles Lindbergh -

c. Challenger space shuttle -

d. Chuck Yeager -

1. Dick is an adventurer and his younger brother Burt is an innovator. Together they take entrepreneurship to new heights … literally. Page 51 tells a lot about Burt’s personality, having “a habit of finding breakthroughs where others saw nonsense” and being “mischievous and anti-establishment.” Why might these be valuable characteristics in both an inventor and a business start-up owner?

Answer:

2. While Peter is still in school dreaming of space, Burt is opening his first business (1974) and then a second (1980). What were the names and goals of these two businesses?

Answer:

3. Voyager was amazingly constructed “in a hangar donated by the Mojave Airport, was funded through (small) contributions, and built with donated parts and a mostly volunteer crew.” This is classic bootstrapping, a very important concept. Search Google for “bootstrapping in business” and write a definition.

Definition:
4. Note the arguments Burt and Dick have on Page 57. Oftentimes good people with similar objectives have a different way of seeing things. If you were starting a business and your partner disagreed with you on an IMPORTANT point, how would you handle the situation (ignore them, leave them, give in to them, other???)

Answer:

5. Imagine you’ve started a business, but you don’t know if anyone will care. That was Dick’s thoughts as he was going to land Voyager. He did not know that in the past 9 days he (and his business) had become world famous. Choose one word to describe how you would feel if after years of work, your business became “an overnight success.”

Answer:

6. The chapter ends with the Challenger disaster and NASA becoming increasingly cautious about flying to space. This is 1986. Based on the first four chapters, do you think Peter and Burt Rutan are more or less excited about space at this time?

Answer:

7. Your question related to the story or entrepreneurship for the author.

Answer:

After you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   e. Burt Rutan -
   f. Dick Rutan -
   g. Mike Melvill -

WATCH IN-CLASS, keeping an ear out for “entrepreneur-speak”
www.youtube.com/watch?v=TunNoIO9I4U

CHAPTER FIVE: SPACE MEDICINE

Peter’s story continues when he graduates from college and goes to medical school. Will this move extinguish his hope of being a space cadet? Will it kill his entrepreneurial spirit? Read on.

1. At Harvard Medical School (only a few miles away from MIT) Peter is stuck doing something he “didn’t love” – just to impress his family. He still is running SEDS (his worldwide college space club) and volunteering on MIT’s space projects, but that is wearing thin. Have you ever had big dreams of doing one thing only to have others expect something else from you? If yes, explain. If no, what advice would you give Peter?

Answer:
2. Now back at MIT as a student, Peter notices a “common problem” (p. 71), prolonged time in space hurts the human body. As any good entrepreneur, tinkerer and maker would do, he sets out to find a solution. For the entrepreneur and hands-on learner, answers can come from anywhere. What children’s playground toy gave Peter his answer to this space problem?
Answer:

3. In 1987, Peter, Todd, and Bob not only hold an international space conference, but also begin their own space university. The name of their newest business start-up is ISU. What does that stand for?
Answer:

4. The author states that NASA’s famous saying “Failure is not an option” went from being something laudable to something lamentable. How can this saying be good for an entrepreneur? How can it be crippling, even fatal to a new business start-up?
Good because:
Bad because:

CHAPTER SIX: BEING A LINDBERGH

We now meet the third major character in our story. Erik Lindbergh is the grandson of Charles Lindbergh, perhaps the most famous pilot of all time. At 21 years of age, Erik is also an adventurer, in this case mountain climbing and skiing. Unfortunately, one’s family history, both good or bad, can weigh a person down.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. Lindbergh flight -
   b. Rheumatoid arthritis -
   c. Erik Lindbergh -

1. Your question related to the story or entrepreneurship for the author.
Answer:

CHAPTER SEVEN: A CAREER IN ORBIT

Peter’s story continues. First in a conversation about philosophy and religion with his friend John, and then about International Space University (ISU) with his friends Todd and Bob, as well as his first for-profit company. The chapter ends with an amazing scene where the dean of the medical school is concerned that Peter isn’t focused on medicine – he is flabbergasted to learn that Peter is
doing medical school, is head of his own university, and he is CEO of a rocket company. Talk about an entrepreneur – and you thought you had a lot of homework!!!

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. Idealist -
   b. Pragmatist -

1. Rather than write the date in his journal, Todd tracks time by the days he’s been alive. Go to www.timeanddate.com/date/duration.html and write down how many days you’ve been alive.
   Answer:

2. Like Dick and Burt Rutan, the creative team of Peter and Todd also “squabbled and disagreed” (p. 92). Many entrepreneurs start a business with a friend or family member, an idea that has both pros and cons. Do you think you could go into business with a partner? Why or why not?
   Answer:

3. Around the age of 27, Peter starts his first for-profit business, International Microspace. What is the vision for this new company?
   Answer:

4. Your question related to the story or entrepreneurship for the author.
   Answer:

CHAPTER EIGHT: STRUGGLES IN THE REAL WORLD

Peter’s friend and business partner Gregg is featured in this chapter, as is some life-altering news from his friend Todd. A big lesson for entrepreneurs is seeing how difficult running a business really is and how making agreements today may come back to hurt you tomorrow. The chapter ends with important quotes from Charles Lindbergh’s book.

1. Page 102 is a real eye-opener. Peter’s first for-profit business, International Microspace, is in trouble. Although they identified a “common problem” and are providing customers a solution, there are many concerns. What are some of these concerns?
   Answer:

2. To start International Microspace, Peter accepted $100,000 from Walt Anderson with the agreement that he would never approach the government for support. Unfortunately, it is government that sends up satellites (i.e. - government has money for research and is a potential customer). Was Peter right
to agree to Walt’s demands in the beginning? Would you take money from an investor if you thought it might later hurt your company’s ability to grow?

Answer:

3. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER NINE: MEETING THE MAGICIAN

Our stories converge for the first time, with Peter coming to Kern County (“we are in the middle of nowhere,” Peter thought) to meet Burt Rutan. By 1993 Peter has opened another business, Angel Technologies to take advantage of the newly commercialized internet. He also has plans for a third company, Zero Gravity Corp. Let’s see how this first meeting of our two geniuses goes ...

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Charismatic -
b. Enigmatic -

1. The last few chapters have mentioned a lot of people Peter knows or knows of. Don’t let that confuse you. In fact, notice that as Peter starts these different ventures, he relies heavily on networking (calling friends, friends of friends, acquaintances, strangers, etc.). He then sets up meetings like the one with Burt. They start with friendly small talk and then get down to business. What can you do this semester to start developing your list of contacts?

Answer:

2. We are starting to see that many inventions are the result of private inventors going after prize money. This is a great idea since if the item you want can’t be invented, you don’t have to pay. You only pay out the prize if the invention is successful. What would you do if someone said they would give you a million dollars for your major invention, but only if you could get it to work in the next two years?

Answer:

3. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER TEN: AN OUT-OF-THIS-WORLD IDEA

The plot thickens! Part One of the book ends in 1993 with Peter, always full of ideas and already connected with Burt Rutan on one project, coming up with yet another idea. This idea will send a private person into space with no government assistance. Next, Peter assembles yet another group. There is a lot of
cool science discussed in this chapter. You can pause to study, or you can just marvel at how a group of smart and innovative people are getting together to discuss a common problem and to brainstorm possible solutions.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. Orteig Prize -
   b. Jeff Bezos -
   c. Karman line (62.5 miles)

1. P. 134. Peter writes “There are few chances in one’s life to aspire to greatness. When such an opportunity comes along, the most difficult job is to recognize it, the second most difficult job is to take the risk of acting upon it? Why are each of these two tasks so difficult?

Answer:

2. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER ELEVEN: EYES ON THE PRIZE

Part II begins with our third protagonist, Erik Lindbergh finally meeting Peter as they launch the X Prize. We also say goodbye to Peter’s good friend and International Space University (ISU) partner Todd.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. Smithsonian National Air and Space Museum -
   b. Byron Lichtenberg -
   c. Earthrise -

1. Peter knew a lot of people, but not everyone. On p. 140. “Peter was there to do what most business advisers caution against: crash a party, furtively elbow your way to the host, and pitch your idea.” This is a gutsy move by Peter (who apparently isn’t afraid of rejection anymore) to meet Reeve Lindbergh. Why do you think most business advisors think crashing a party to make a new business contact is not a good idea?

Answer:

2. On page 144 Peter tells Erik that the government is not in the business of taking risks, implying that entrepreneurs will need to take the risks if we are to return to space. What are some of the risks Erik’s grandfather, Charles Lindbergh, and others took in pioneering air travel in the 1920s?

Answer:
3. An important trait for an entrepreneur is salesmanship. Peter and Bryon are trying to “sell” Erik on the idea of supporting their private space prize, but Erik is more interested in things on earth, such as the environment. Bryon is a smart-enough salesman to realize Erik’s passion and to immediately re-frame his sales pitch for space in terms Erik can appreciate. What sales approach on p. 147-148 does Bryon take to better relate to Erik’s needs?

Answer:

4. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER TWELVE: COWBOY PILOT

Back in the Mojave Desert in Southern California, we are reintroduced to Sally and Mike Melvill, friends of Dick and Burt Rutan. Mike is Burt’s #1 test pilot, but he didn’t start out as a pilot, in fact he started as a high school dropout and an immigrant from South Africa who never flew until he was in his early 30s. The Melvills’ story is inspirational. Enjoy!

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Rutan VariViggen -

b. Asymmetrical -

1. What does the author mean when she says on page 154 that Burt Rutan was “deliberately contrarian”? Why is this a valuable trait for an inventor and an entrepreneur?

Answer:

2. Entrepreneurship involves stepping into the unknown. And it involves getting others (investors, customers, employees) to buy into your dream such that they too are willing to step into the unknown with you. What actions did Sally and Mike Melvill take in the mid-1970s that indicated they bought into Burt’s vision?

Answer:

3. Entrepreneurs receive inspiration from the simplest of things. What first inspired Burt to start selling build-it-yourself airplane kits? How did his early days building model planes by hand help him later? A few pages further on, what event inspired Burt to put a test pilot on top on what was supposed to be an unmanned remote-controlled drone?

Answer:

4. Your question related to the story or entrepreneurship for the author.

Answer:
CHAPTER THIRTEEN: HISTORY REPEATS ITSELF

The entire book so far has led up to today, May 18, 1996. After a lifetime of laying the groundwork for his dream of private space travel, Peter is ready to announce the $10 million XPRIZE! As you read this remember, this story isn’t only about space travel … it is about entrepreneurs and mavericks doing something that has never been done before. As always, read this chapter with a sense of wonderment.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. St. Louis Gateway Arch-
   b. Benefactor -

1. Why is Burt Rutan arguing with NASA director Dan Goldin? Note that they both want the same thing, but are approaching things from different perspectives. Can you name a small entrepreneur and a large corporation that may also have similar ideas but a different approach?

Answer:

2. What were some of the reasons Charles Lindbergh wanted to fly from New York to Paris?

Answer:

3. P. 173 “Gregg … believed that the XPRIZE would soon find its benefactor … attracting teams, on the other hand, might be more difficult.” Despite all the preparation work Peter did, this line reveals a major miscalculation on his part. He thought that finding a $10 million sponsor would be easy, while finding people who would be willing to make a spaceship would be hard. As we will see, just the opposite was true. From an entrepreneur’s viewpoint, why was it a good idea for Peter to announce the XPRIZE even though he did not have the $10 million or any teams signed up?

Answer:

4. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER FOURTEEN: THE SPACE DERBY

In the last chapter, Burt Rutan announced he was going to build a spaceship in hopes of winning the $10 million XPRIZE, but he was not alone. This chapter and much of the rest of the book details the entrepreneurial spirit of the various teams. This is an amazing chapter. ORDINARY people with EXTRAORDINARY dreams. Here we meet John Carmack (Texas), Dumitru Popescu (Romania), Pablo de Leon (Argentina), Steve Bennett (England), and a few others.
Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. Accredited Investor (use book’s definition on p. 180) -
   b. Open source -

1. John Carmack is a video game designer who gets interested in rockets after reading some Robert Heinlein space novels. At this point he knows nothing about rockets, so what steps does he take to become an expert?
Answer:

2. Talk about an audacious entrepreneur and maker, Dumitru Popescu is a 20-year old student. When he tells his young wife he wants to build a rocket and send it to space, she gives him all the reasons not to make it. In response, Dumitru shakes his head and says ...
Answer: “Let’s

3. Toward the end of the chapter Carmack decides to give money to a few competitors in the smaller CATS Prize, but is surprised that some teams don’t respond, others have no plans, and still others say it will be easy. In other words, all talk but no action. This is an important lesson for this class … entrepreneurship is more than dreaming – it is doing! A bias for action. Carmack finally invests in some teams, but they aren’t successful. What is Carmack’s attitude toward failure?
Answer:

4. Your question related to the story or entrepreneurship for the author.
Answer:

CHAPTER FIFTEEN: EPIPHANIES IN THE MOJAVE

The chapter begins with a harrowing tale which further illustrates what type of person Dick Rutan is and the gives deeper insights into the Rutan brothers’ internal drive. Months later, Mike Melvill and pilot / engineer Pete Siebold (both who will be important players in our story later on) are getting space flight training in order to fly Proteus, the high-flying plane Burt Rutan’s Scaled Composites company is building for Peter’s Angel Technologies company.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. Peter Siebold -
   b. Paul Allen -

1. Dick Rutan says of his brother’s designs “no way is this going to work” and “no way we can get it done that fast”. But Burt responds with “gray today, white tonight” … in other words my design may be gray sheet metal in the
hangar today, but by the end of the day we can paint it white and take it for a test flight. How does this attitude encapsulate an entrepreneur’s bias for action and a willingness to fail?

Answer:

2. Burt Rutan is a small-business owner in Mojave, California. Burt is a doer. He is the ultimate tinkerer before such a term was commonly used. He isn’t afraid to take chances. Burt’s wild innovations attract attention from Microsoft cofounder Paul Allen. Allen meets with Burt in Mojave, and Burt mentions using his Proteus airplane to launch a rocket into space. Allen knew enough about Burt to take him seriously. But for now, it is just an idea. “I don’t know if I can do this, it’s just something I’ve been thinking about,” Rutan says on page 201. What are some ideas you are thinking about (name one or two)? What are you doing to work on these ideas?

Answer:

3. What do the last two lines of the chapter tell you about the entrepreneur’s mind?

Answer:

4. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER SIXTEEN: PETER’S PITCHES

As I read this chapter I’m reminded of the book and movie Forrest Gump, where the title character interacts with some of the most famous people in recent history. It is mind-boggling the sheer number of people Peter talks to trying to find $10 million for the XPRIZE. It is also a testament to his persistence and credibility that he is able to schedule meetings with some of the most famous people of the turn-of-the-century. This is real-life Shark Tank!

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Dot-Com Bubble -
b. Richard Branson (note that Mr. Branson wrote the preface of this book which we read together in August) -
c. Jeff Bezos -

1. Famous adventure novelist Tom Clancy has two important quotes, one about the difference between private industry and government and another about the meaning of “impossible”. What are these two quotes?
The difference between private industry and government:
The meaning of impossible:
2. Peter no longer fears rejection, so he starts asking potential sponsors to put up the $10 million for the XPRIZE. His first pitch is to a St. Louis business, Maritz Inc. Name other companies and people mentioned in this chapter to whom he presented?

Answer:

3. The chapter ends with FirstUSA offering $5 million if they can get the XPRIZE mailing list (so they can sell credit cards), and if Peter can find the other $5 million from someone else, and if the prize is won by a certain date. Why do you think Peter says “yes” to this deal? What would you have done?

Answer:

4. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER SEVENTEEN: A LINDBERGH SCULPTS A DREAM

Erik Lindbergh finally gets the medical help he needs to combat his disease. Along the way, he also finds that making wood sculptures connect him to nature (his first love), his famous grandparents (who he and others in his family tried to downplay in public), and earning a living (entrepreneurship once again on display).

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
  a. Mayo Clinic -
  b. Driftwood -
  c. Serendipitous -
  d. Catharsis -

1. Erik’s entrepreneurial track is to create sculptures out of driftwood. How is Erik’s new business about more than making money? How does this business help in his overall recovery?

Answer:

2. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER EIGHTEEN: PETER BLASTS OFF

It is 2000 and Peter still is looking for the other half of the $10 million XPRIZE money, but he has also decided to take a job as CEO of a new company called Blastoff started by internet entrepreneur Bill Gross and his brother Larry. This is when the internet was new and companies were popping up everywhere. What could possibly go wrong?
1. On pages 230 and 233 we see a common argument within business: Engineers vs. Marketing. In this case the engineers want a fully functioning robot that can collect moon samples. The marketeers want cute robots with human-like features which will help sell the moon samples to the public. Who do you side with? Answer:

2. Eventually Blastoff failed, and with it Peter lost credibility within the space industry and experienced personal and professional defeat. Now nearing 40-years of age he is living in a small apartment, no closer to the moon than he was when he was in college, and not sure where to turn to next. When do you think it is time to give up on your dreams and go to work for a stable company with a stable paycheck? Answer:

3. Your question related to the story or entrepreneurship for the author. Answer:

**CHAPTER NINETEEN: ELON’S INSPIRATION**

Enter one Elon Musk. Still in his 20s and already a millionaire. And where does he want to spend those millions … on space exploration, of course. This is a great chapter detailing how a business meeting with engaged, confident, and visionary people happens in real-life. As you read, pay attention to how Peter, Elon, and Adeo process ideas and how they interact with one another.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Disheveled -
b. Affable -
c. Elon Musk -
d. ‘Playing devils advocate’ -
e. Stasis -
f. Philanthropic -
g. Apathy -
1. Entrepreneurs challenge the status quo and the prevailing thought. Reread the first paragraph on page 239. What starts out as a joke quickly ends with curiosity ... asking why! On a scale of 1-10, how curious are you? When you see something new is your first reaction “I don’t know about that so I’ll ignore it” (a “1”), or “oh that’s nice” (a “4”), or “I wonder how that happened (a “7”), or “Why does that work the way it does” (a “10”). Give an example from your life.

Answer:

2. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER TWENTY: BURT AND PAUL’S BIG ADVENTURE

There is so much to explore in this chapter. Basically Burt has an idea and Paul Allen has money, so let the negotiations begin! We are also introduced to 26-year old Matt Stinemetze who becomes Burt’s project engineer and Dave Moore who will oversee Burt and Paul’s new spaceship company. We’ll read this in class so we can dissect it together.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Majority owner -

b. Minority interest -

1. Page 247 states that “like his doodles on napkins, the models were a part of Burt’s process.” This is a fascinating sentence. It implies that we each have procedural steps we take to flesh out our ideas and build our vision. Author J. K. Rowling states that the full storyline of Harry Potter just “strolled into my head, fully formed.” Wouldn’t that be nice! Rutan is different “Burt plotted and planned and worked out hundreds of details in his mind before testing anything in a computer.” The next time you speak to an entrepreneur (your
teacher counts), ask him or her how he or she gets ideas and then starts to build upon them over time.

Answer:

2. Entrepreneurs get their inspiration from many places. Burt has been thinking about sending a vehicle into space for a lifetime, but decides the Air Force had a winning idea in the 1950s when they had a giant B-52 carry the X-15 rocket ship high into the atmosphere before releasing the X-15 and let it blast off into orbit.

Watch the first 1:45 seconds of this video: youtube.com/watch?v=HuXH7iBrfxo

3. To truly appreciate the revolutionary, visionary aspect of this story, you need to understand the “feather.” Introduced on page 249, it will be referenced throughout the rest of the story.

Discuss this image in class:

4. Vision is important, but so is paying the bills. Notice that on page 252, when business is slow, Burt’s small business, Scaled Composites, “took on projects to keep everyone employed.” That included young engineer Matt Stinemetze being asked to make a fiberglass cow for an artist. If your boss asked you to do something interesting but had little to do with your job title, what would you do? Why?

Answer:

5. Burt tells Paul Allen he can do a space project “real quick” and keep cost down, but notice he has already put a lot of time and thought into making this happen. What do we call it when an entrepreneur releases an idea or product or service quickly, learns his or her lessons, and then releases it again, and again, and again?

Answer:

6. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER TWENTY-ONE: A LIFELINE FOR THE XPRIZE

“It is always darkest before the dawn” and things at the XPRIZE are looking pretty dark. They are down to one paid part-time employee (Gregg) left just to answer the telephone. No sponsor in sight. No money really at all to keep the office even open. They need a superhero who can fly. What they get is a superhero who can fly … an airplane.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
1. In addition to Erik’s family offering various levels of support for his plan, Gregg and Peter, two friends who both want the XPRIZE to succeed, have different thoughts about Erik’s planned flight. Summarize each person’s initial thoughts.

Gregg’s initial thoughts about Erik’s plan:
Peter’s initial thoughts about Erik’s plan:

2. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER TWENTY-TWO: A DISPLAY OF HARDWARE

In Chapter 14 we met some of the contestants who are trying to win the XPRIZE. Although Peter and Gregg still don’t have the $10 million prize money, the contenders – dreamers, makers, engineers, space geeks – are still inventing away. Let’s catch up on their exploits …

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Type “A” Personality -

1. Once more we gain incredible insight into what makes an entrepreneur tick. This time it is England’s Steve Bennett. “After years of dreaming, scrimping, building, and testing, the moment of truth was here. This was what he’d worked for—the answer to his fears that he would go through his life as a ‘conventional person,’ that he’d be lying on his deathbed, bills paid, but unfulfilled” (page 268). Note that Bennett (and the others in this book) don’t just dream; they do! Everything they strive for is wrapped up in this minute. What guest speaker whom we’ve heard in this class thus far do you think fits this description? Why?

Answer:

2. John Carmack wants his new Armadillo Aerospace company to “celebrate the positive but don’t get torn up about the negative.” Why is this good advice for any small business?

Answer:

3. How do John Carmack and his wife Katherine’s different personalities make them good business partners? How can this strategy (spouse or friend as a business partner) be disastrous for both the business and the relationship?

Answer:
4. In Romania, Dumitru Popescu has the entrepreneur’s typical “it can’t be done” detractors, as well as those who believe in him (his volunteers, his wife, his father-in-law). But sometimes in business, getting on the wrong side of a single person could spell doom. In this case, Dumitru Prunariu, head of the country’s space agency, doesn’t take too kindly to the competition from amateurs. If a powerful person was to trash talk you and your idea in public, do you think it best to defend yourself or to ignore the criticism and hope it goes away?

Answer:

5. Your question related to the story or entrepreneurship for the author.

Answer:

**CHAPTER TWENTY-THREE: ANOTHER LINDBERGH TAKES FLIGHT**

At every turn, you’ll find people telling you why your idea won’t work. For Peter, the 9/11 terrorist attacks are the latest reason he’s told to give up. But he still has a workable plan, so he doesn’t give in. He encourages Erik Lindbergh to also follow his dream. This is a beautifully written account of two Lindbergh’s—separated by 75-years, but brought together by so much more. Enjoy!

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Dramamine -

1. Your question related to the story or entrepreneurship for the author.

Answer:

**CHAPTER TWENTY-FOUR: A HOLE IN ONE**

Part II of the story ends with Peter finally securing his $10 million prize. Again, this is a powerful look into how business deals are brokered and how visionaries persevere! Expect the unexpected!

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):

a. Balloon payment -

b. Anousheh Ansari -

1. After six-years, Peter finally gets the sponsorship phone call he has been waiting for. And it comes from … immigrants who came to America with little money and unable to speak English. Education, hard work, and entrepreneurship prove a successful combination for the Ansaris family. And it comes from a woman engineer who is not afraid to take risks.
2. Why do you think an entrepreneur was the one to say yes, when so many big name companies and CEOs said no?

3. Your question related to the story or entrepreneurship for the author.
Answer:

CHAPTER TWENTY-FIVE: A FIRE TO BE IGNITED

Part III of the story is a Kern County tale. Burt Rutan and Mike Melvill and their small business, Scaled Composites, take center stage! The ride gets bumpy, so hang on!

A small business needs to know itself, and Burt knows he needs to hire (outsource) other companies to build some of the rocket parts. This turns out to be a challenge, but he finally sets up a competition between two of them, with the winner getting the job. Meanwhile, Burt’s partner (Paul Allen from Microsoft) is sending in extra managers to try to teach Burt’s very creative company how to be more organized and structured.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. Admiration -
   b. Exasperation -
   c. Bereft -
   d. Midas touch -
   e. SpaceX -

1. The ex-Microsoft managers who are trying to keep Burt on schedule state that Burt’s team is “a bunch of motorcycle mechanics in the desert building a spaceship!” The author states that this was said with “admiration or exasperation, depending on the day.” What do you think the author means by that?
Answer:

2. After Burt’s unveiling of his new spaceship, Peter finally sees that his lifelong dream is happening. “There were teams building rockets in backyards, rice fields, and deserts. They were willing to risk everything, from ridicule and debt to their personal safety.” All of this because of Peter’s vision and perseverance. Sometimes it is said that “one person can’t make a difference.” Peter proves this wrong. Write a few lines, in your own words, on WHY one person can make a difference, especially if that person is a true entrepreneur.
Answer:

3. Your question related to the story or entrepreneurship for the author.
Answer:
CHAPTER TWENTY-SIX: THE TEST OF A LIFETIME

Yet another amazing chapter that defines the human spirit. We see Burt’s ingenuity on full display as well as his sense of humor and sense of play (if we take off work right now, we still have time to play some golf). We are also introduced to pilot Brian Binnie – pay particular attention to his background, what makes him tick, and what propels him forward. We can learn much from him.

Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
   a. Brian Binnie-
   b. Oscillation -
   c. Sonic boom -
   d. Inconsolable -

1. Entrepreneurs and makers observe a problem (opportunity) and seek out fast and creative solutions. Burt’s solution for thermal protection upon re-entry into the atmosphere was body putty (similar to the BONDO you’d put on a car’s dent before repainting it). In one of the more comical scenes from the book, what did Burt mix with the body putty to give the illusion that it was “high tech?”
Answer:

2. Kevin Mickey, an executive at Scaled Composites, is mentioned on only one page in this book, but even there we see the type of people Burt hires. Clearly here is a man with great vision and a strong work ethic. What job did Mickey do when he started at Scaled Composites and what job did he have at this point in the story?
Answer:

3. What was Burt’s reason for telling Brian about golfer Doug Sanders? What was Burt saying about “failure”?
Answer:

4. Your question related to the story or entrepreneurship for the author.
Answer:

CHAPTER TWENTY-SEVEN: FLIRTING WITH CALAMITY

Time for one more test flight - this one into space - before the two official XPRIZE flights. Test pilots are a different breed of people. Although they all know that the next flight (especially in a first-of-its-kind spaceship) could be their last, pilots Mike Melvill (the high school dropout), Pete Siebold (the Cal Poly engineer), and Brian Binnie (the Ivy League educated Navy pilot) all want the gig. Badly.
Before you read, provide one line definitions (Google/Wikipedia definitions acceptable):
  a. Calamity -
  b. Palpable -
  c. FFA Commercial Astronaut Wings -

1. Again, the entrepreneurial mind is always thinking of future opportunities and new problems to solve. On page 335 we learn that although he hasn’t even gotten to space yet he already has designs for many new projects. What are some of the projects he shares with billionaires Paul Allen and Richard Branson?
   Answer:

2. Another trait of entrepreneurs is pride of ownership. On page 337-338 we see Burt wanting to share his success with guests who have come to witness his test flight. What are some of the things Burt does (at 4 in the morning by the way) in order to meet these people?
   Answer:

3. Your question related to the story or entrepreneurship for the author.
   Answer:

**CHAPTER TWENTY-EIGHT: POWER STRUGGLES**

*It’s important to talk about “fail fast and learn,” but here we see that Burt succeeds with the test flight, but still needs to continue learning if he wants to win the XPRIZE. Burt’s idea … attach missiles to the spaceship! No one else thinks this is a good idea. How do you tell an inventor that has never been wrong that he wrong, especially when he is the boss. And will he listen even if you tell him?*

Meanwhile, Brian Binnie continues to live down his crash landing in the hope of flying SpaceShipOne again.*
1. Scaled Composite is a small business that relies on a team of professionals. This includes three test pilots, all of whom want to fly the spaceship. Flight engineer Doug Shane usually waits until one day before the flight to announce who will pilot the ship. If you were the manager who named the pilot, what would you do? Why?

Answer:

2. What does it take to become “world class”? For Brian Binnie, an accomplished Navy pilot, it means not only spending hours in the flight simulator and mentally thinking about every moment of the flight during his evening runs, it also means doing 84 practice landings in the Long-EZ with Mike Melvill. Name a famous athlete or actor, or an entrepreneur or other person of whom you are aware that put in the extra work to be “world class”. Briefly tell what he or she did (it is okay to do internet research on this) to become world class.

Answer:

3. Pages 357–58 give an amazing account of why Burt Rutan is a leader rather than a manager. Drawing from our lecture on leadership (lesson 2) and John Maxwell’s leadership book (if you read it), what does this passage so eloquently define as “being a leader”?

Answer:

4. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER TWENTY-NINE: IN PURSUIT OF A MASTERPIECE

With Rutan ready to launch for the XPRIZE, other teams go into overdrive. They aren’t ready to test with live pilots, but at least they want to get a rocket up to prove they are contenders.

1. International entrepreneurship on display with Popescu’s successful test launch characterized as “all of the work, struggle, ridicule, and doubts suddenly felt worth it … Popescu was broke, but he had created a company and a brand.” Why do you think Popescu, who spent his last dime on this launch, considered it worth the trouble? (You can also look at where Popescu is today: He has his own aerospace company in New Mexico.)

Answer:

2. From time to time you’ll hear people speak of the “American can-do spirit”. Perhaps this is something we take for granted, but England’s Steve Bennett wishes his country had more of it. Read his quote on the bottom of page 370 then discuss why you think American’s have a reputation more than citizens of other countries for making their dreams come true.

Answer:
CHAPTER THIRTY: ONE FOR THE MONEY

All eyes were on Mojave...

1. In Peter’s pre-flight remarks he states “What happens here in Mojave is not about technology. It is about a willingness to take risk, to dream, and possibly, to fail.” Peter is correct—this isn’t a space story, it is an entrepreneurship story. It is a story about making your own future. What has this book taught you about entrepreneurship (feel free to look at past chapter worksheets)? What has it taught you about the importance of building, testing and understanding technology?

Answer:

2. Your question related to the story or entrepreneurship for the author.

Answer:

CHAPTER THIRTY-ONE: ROCKETING TO REDEMPTION

To win the XPRIZE, Scaled needs to fly to space twice within two weeks. Brian Binnie finally gets the chance to fly into space. In yet another crazy story, he ends up being kept awake by the dog while sleeping on the couch the night before this historic flight. At least he has his morning coffee to keep him awake… not!

1. Your question related to the story or entrepreneurship for the author.

Answer:

FYI—Converting feet to miles... 
SpaceShipOne ultimately reached 69.6 miles (suborbital space) 
White Knight released SpaceShipOne after climbing the first 8.9 miles (47,100 feet … commercial airplanes fly at 39,000 feet)

CHAPTER THIRTY-TWO: HALLOWED COMPANY

SpaceShipOne now hangs from the ceiling of the Smithsonian National Air and Space Museum, as does the Wright Brothers plane, Charles Lindbergh’s plane, John Glenn’s Mercury spacecraft, the Rutan’s Voyager, and other machines that made history.

The impossible was possible.
1. What are the most important traits needed to pull off what others called “impossible”? Who do you relate to in the book? What are your “crazy” dreams?
Answer:

2. Your question related to the story or entrepreneurship for the author.
Answer:

SpaceShipOne now hangs out in Washington D.C., its wing almost touching the wing of Charles Lindbergh’s Spirit of St. Louis.

“I will keep dreaming. It is my belief, and it is the message of this book, that there is no boundary of human endeavor. Raise your sights. Remember to look up at the stars and not at your feet.”

—Stephen Hawking, from the afterward
A special thank you to high school educator Mike Russo for helping to develop this lesson plan on entrepreneurship and STEM. Russo's school is in Kern County, not far from where history was made in the Mojave Desert.