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### Tour:

## Texas Space STEM - Space Center Houston

### Destination:

Johnson Space Center, HOUSTON, TEXAS, USA

### Specialization:

Science, Maths, Engineering & Physics

### Itinerary:

7-days/6-nights in destination

### Availability:

Year-round; Sunday departures

## Texas Space STEM - Johnson Space Center, Houston, Texas, USA

Day		Morning		Afternoon	
1	Sun	Fly to Houston; Check into Hotel; Welcome & Safety Meeting; Dinner on Own			
2	Mon	Team Briefing & Starship Gallery Tour	Rover Design Project	Space Suit Design - JSC Engineer	Rover Purchasing
3	Tues	Neutral Buoyancy Lab Tour	Mars Rover & Spectrometer Presentations	Rock Lab and Curatorial	JSC Tram Tour/Rocket Park
4	Wed	Mars Lander Design and Construction	Mars Lander Competition	ASTRONAUT TRAINING / DIVE SESSION	
5	Thur	Rocket Design Presentation	2-Stage Rocket Design, Purchasing & Orbital Lofting Projects	2-Stage Rocket Construction Project	Communication Presentation
6	Fri	Space Physiology Presentation	Astronaut Brunch & Graduation Ceremony	Rover Engineering, Obstacle Course, Launch & free time at the Center	
7	Sat	Free Time		Depart Houston	



## Specialists in STEM Student Travel

As with all sample itineraries, please be advised that this is an 'example' of a schedule and that the activities and hotels shown may be variable dependent upon dates, weather, special requests and other factors. Itineraries will be confirmed prior to travel.



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**OVERVIEW:** Students in Visions' Texas Space STEM will experience a 5-day engineering mission to land a rover on the surface of Mars. They will analyse rock samples with a Reflectance Spectrometer, loft a rock sample into Martian orbit, and return it back to Earth in a rocket of their own design. All the time, working within a NASA budget; knowing that funds or supplies for your projects may be decreased at any time due to budget cuts, safety regulations, or any other experience representative of the real NASA world.

**Skills Required:** Teamwork, Problem Solving, Fiscal Responsibility, Communication, Adaption to Unexpected Problems, The Drive to be Successful and most importantly, the ability to have fun through science!!

### Day 1

Dinner on Own

**Houston....** A sprawl of concrete and superhighway? Intense summer heat? Yes - Houston has some of that. But the USA's fourth-largest city (5 million in the metro area) is also a multicultural, zoning-free hodgepodge where in one strip mall there might be a Vietnamese grocery, a Venezuelan empanada stand and a big-beef meat market. Eat at great ethnic restaurants or shop in arts-and-antique neighbourhoods. See world-class paintings and funky folk car parades. Then just down the road a bit you can walk the beaches of Galveston Island and visit the astronauts at Space Center Houston. Often described as a "sprawling Texas town," the greater Houston area covers more ground than any other major city in America.



Houston is a city whose very existence has always depended on wild speculation and boom-and-bust excess. Founded on a muddy mire in 1837 by two real estate-booster brothers from New York – their dream was to establish it as the capital of the new Republic of Texas – Houston was soon superseded by the more promising site of Austin, even while somehow establishing itself as a commercial center. Oil, discovered in 1901, became the foundation, along with cotton and real estate of vast private fortunes, and over the next century wildly wealthy philanthropists poured cash into swanky galleries and showpiece skyscrapers. Locally produced oil and gas products exported from the Houston Ship Channel have long fuelled the city.

In 1958, President Lyndon Johnson (a Texan) located the National Aeronautics and Space Administration (NASA) here. Houston is also a multicultural city home to some of the nation's largest Asian, Arab and Latin American populations. But its culture is not limited to diverse population — it also boasts a world class symphony and theatre district that includes a full-time ballet company and opera.

Houston is a beast of a place, choked with rings of highways and high on humidity. Despite this, its sheer energy, its relentless Texas pride, and above all, its refusal to take itself totally seriously, lends it no small appeal. For visitors, its well-endowed museums, highly regarded performing arts scene, and decent nightlife mean there is always something to do. [www.visithoustontexas.com](http://www.visithoustontexas.com)

Did you know?

- ✓ Houston is the fourth most populous city in the nation (trailing only New York, Los Angeles and Chicago), and is the largest in the southern USA.
- ✓ If Houston were an independent nation, it would rank as the world's 30th largest economy.
- ✓ Houstonians eat out more than residents of any other city. While here you can choose to indulge in one of the more than 11,000 restaurants ranging from award-winning and upscale to memorable deli shops.
- ✓ Houston has a Theatre District second only to New York City with its concentration of seats in one geographic area. Located downtown, the 17-block Theatre District is home to eight performing arts organizations with more than 12,000 seats. Houston has more than 500 cultural, visual and performing arts organizations.
- ✓ More than 90 languages are spoken throughout the Houston area.
- ✓ Houston is home to the Houston Livestock Show and Rodeo. The largest rodeo in the world, it attracts more than 1.8 million visitors each year.
- ✓ Houston has among the youngest populations in the USA.
- ✓ Houston is home to the Texas Medical Centre, the largest medical center in the world, with a local economic impact of \$10 billion. More than 52,000 people work within its facilities, which encompass 21 million square feet. Altogether 4.8 million patients visit them each year.
- ✓ When comparing Houston's economy to a national economy, only 21 countries other than the United States have a gross domestic product exceeding Houston's regional gross area product.
- ✓ Home to more than 5,000 energy related firms, Houston is considered by many as the Energy Capital of the world.
- ✓ The Port of Houston is the tenth largest port in the world.



Groups participating in Visions' Texas STEM will generally arrive in Houston in the late afternoon. Upon arrival, your coach will be awaiting your school to transport you swiftly to your hotel. **HOTEL OPTIONS:**

**Sample Hotel – Springhill Suites Houston NASA / Webster** - Just three miles from the Johnson Space Center (NASA headquarters and home to Johnson Engineering, and the Space Hub research facility), the Springhill Suites hotel provides easy access to several attractions nearby. All rooms contain two queen beds plus a pull-out sofa sleeper. Students will sleep quad occupancy; staff will sleep double occupancy. Room amenities include free high-speed internet access, cable television, hair dryers, in-room coffee maker, mini-fridges and microwaves, and voicemail. Hotel amenities include elevators, business centre, guest laundry, indoor corridors, small outdoor pool, sundry shop and meeting rooms. [WEBSITE](#)



If the Springhill Suites property is chosen, your evening plan will include:

Evening Plan for Springhill Suites Groups
Day 1 / SUNDAY: Arrival day; no planned activities / dinner on own
Day 2 / MONDAY: Pizza Night at Hotel
Day 3 / TUESDAY: Dinner at Luby's Cafeteria + Cinema Night
Day 4 / WEDNESDAY: Dinner at Fuddruckers + Baybrook Mall excursion
Day 5 / THURSDAY: Dinner + Bowling at the Main Event
Day 6 / FRIDAY: Dinner at Bubba Gumps + The Kemah Boardwalk
Day 7: Departure

**Sample Hotel – Courtyard by Marriott** – This lovely hotel is located directly across the street from the Space Center allowing for participants to **walk** (approximately 6 minutes each way) to and from their sessions daily. Kick back in luxurious bedding or stay busy with ergonomic workspaces and complimentary high-speed Wi-Fi access. When hunger strikes, head down to the in-house Bistro, serving up great meals, Starbucks beverages and evening cocktails. In your downtime, cool off from the Texas heat in the sparkling outdoor pool, or enjoy a workout in the 24-hour fitness centre, boasting a variety of free weights and cardiovascular equipment with personal TV screens. Students will sleep quad occupancy in rooms with 2 queen beds; staff will sleep double occupancy. You'll want to have everyone bring rain gear in case of inclement weather as we will be walking to the space center daily. [WEBSITE](#)



If the Courtyard property is chosen, your evening plan will include:

Evening Plan for Courtyard Groups
Day 1 / SUNDAY: Arrival day; no planned activities / dinner on own
Day 2 / MONDAY: Pizza Night at Hotel
Day 3 / TUESDAY: Dinner at Fuddruckers + Quiz/Pool Night
Day 4 / WEDNESDAY: Dinner + Bowling at the Main Event
Day 5 / THURSDAY: Movie Night at Space Center + Dinner at Luby's Cafeteria
Day 6 / FRIDAY: Dinner at Bubba Gumps + The Kemah Boardwalk
Day 7: Departure



Please let us know the specific hotel you wish for your lodging to be located in when requesting a quote. Your hotel accommodation will be confirmed to you after initial deposits are received.

After check-in, we'll have our Visions Welcome & Safety Meeting. Dinner is on own to accommodate various arrival times. If you would like us to make a reservation on your behalf, simply let us know. We are delighted to help! Groups will want to get a great night's rest because tomorrow, it's full steam ahead with STEM discovery!

### **Days 2 through 6**

Breakfast, Lunch & Dinner

Rise and shine Houston! Today is the day we delve into Space Science at Johnson Space Center!

**Johnson Space Center** – The Lyndon B. Johnson Space Center (JSC) is the National Aeronautics and Space Administration's (NASA's) center for human spaceflight training, research and flight control. The centre consists of a complex of 100 buildings constructed on 1,620 acres (656 ha) in Houston, Texas. Johnson Space Center is home to the United States Astronaut Corps and is responsible for training astronauts from both the U.S. and its international partners. It is often popularly referred to by its central function, 'Mission Control.'



The centre, originally known as the Manned Spacecraft Center, was constructed on land donated by Rice University and opened in 1963. On February 19, 1973, the centre was renamed in honour of the late U.S. president and Texas native, Lyndon B. Johnson. JSC is one of ten major NASA field centres.

Johnson Space Center has its origins in legislation shepherded to enactment in 1958 by then-US Senator Lyndon Johnson. After President John F Kennedy made the goal in 1961 to put a man on the Moon by the end of the decade, the Space Task Force was formed to lead the Apollo Project. The group would need test facilities and research laboratories suitable to mount an expedition to the moon. In July 1961, NASA Administrator James Webb headed the site selection team. Requirements for the new site included the availability of water transport and an all-weather airport, proximity to a major telecommunications network, availability of established industrial workers and contractor support, an available supply of water, a mild climate permitting year-round outdoor work and a culturally attractive community. Houston was chosen and announced in September 1961. The land for the new facility was donated by Rice University and was situated in an undeveloped area 25 miles (40 km) southeast of Houston near Galveston Bay. Construction of the center began in April 1962 and the facility was officially opened for business in September 1963. When opened, the 1,620-acre (660 ha) facility was originally designated the Manned Spacecraft Center (MSC) and was to be the primary centre for U.S. space missions involving astronauts.



The centre's Mission Control Center has been the operational centre of every American human space mission since Gemini IV. The Control Center manages all activity on board the spacecraft and directs all space shuttle missions. Mission Control Center was constructed in 1962. By 1965, JSC was fully operational and has been responsible for coordinating and monitoring every crewed NASA mission since the Gemini Project.

In addition to housing NASA's astronaut operations, JSC is also the site of the former Lunar Receiving Laboratory, where the first astronauts returning from the moon were quarantined, and where the majority of lunar samples are stored. The center's Landing and Recovery Division operated MV Retriever in the Gulf of Mexico for Gemini and Apollo astronauts to practice water egress after splashdown.

The Johnson Space Center is home to Mission Control Center, the NASA control centre that coordinates and monitors all human spaceflight for the United States. MCC directs all Space Shuttle missions and activities aboard the International Space Station. The Apollo Mission Control Center, a National Historical Monument, can be found in building 30. From the moment a spacecraft clears its launch tower until it lands back on earth, it is in the hands of Mission Control. The Mission Control Center houses several Flight Control Rooms, from which Flight Controllers coordinate and monitor the spaceflights. The rooms have many computer resources to monitor, command and communicate with spacecraft. When a mission is underway the rooms are staffed around the clock.

The centre also handles most of the planning and training of the US astronaut corps and houses training facilities such as the Sonny Carter Training Facility and the Neutral Buoyancy Laboratory, which is a critical component in the training of astronauts for spacewalks. The Neutral Buoyancy Laboratory provides a controlled neutral buoyancy environment a very large pool containing about 6.2 million US gallons (23,000 m<sup>3</sup>) of water where astronauts train to practice extra-vehicular activity tasks while attempting to simulate zero-g conditions. The facility provides pre-flight training in becoming familiar with crew activities and with the dynamics of body motion under weightless conditions.

The visitor's centre of Johnson Space Center is Space Center Houston since 1994.



**Space Center Houston** - Space Center Houston is the visitors' centre of the Johnson Space Center, NASA's centre for human spaceflight activities. [www.spacecenter.org](http://www.spacecenter.org)

*Ever dreamed of being an astronaut? Have you wondered what it feels like to be in Zero G? Do you want to engineer your own robotic rover and launch a rocket?*

*Come behind the scenes with Space Center University and get a taste of space exploration! Space Center University is a challenging five-day engineering mission that facilitates teamwork, problem solving, communication, and adaptation to unexpected problems. Students will develop tools to improve critical thinking skills, creativity, fiscal responsibility and the drive to be successful.*

*Learn about rocket science, have direct interaction with real NASA experts and even brunch with an astronaut! Tour actual facilities where today's astronauts and scientists work. Visit Mission Control and Rocket Park as well as our museum venue with over 400 things to see and do. Compete to be the best team, push your boundaries and expand your horizons. At the end of the week, receive an Official Space Center University Graduation Certificate.*

This will be your home for the next five days. Each day we will have the opportunity to work with scientists, specialists and astronauts to learn and study in this world-renowned facility. We will be working and competing on PROJECT WORK for Engineering, Physics, Space Science and Design objectives. Teachers are encouraged to participate.



Space Center University includes the following:

- Exciting, engineering-based activities
- Behind-the-scenes, hands-on access to “the real thing” with tours of actual astronaut training and work facilities at NASA Johnson Space Center
- Interactive, project-based learning that includes sustainable habitat construction, strategic scientific planning and investigations, SIM activities, “astronaut training,” collaborative teaming and global awareness development
- Brunch with an Astronaut
- Exclusive expert guest speakers with Q&A opportunities
- Graduation certificate and medals for winning team

*Rockets Red Glare - Participants will engineer, build and launch a two-stage rocket. Launching may vary based on weather conditions.*

*Roving Robotics - Students must decide how to create a robotic rover based on a given a set of parameters and tasks that the rovers must accomplish on Mars. They begin with a price list for supplies and then receive varying real-world criteria to design, build and test their rovers.*

*Gravity Gyration - Scuba diving leads off this exciting leg of the Space Center University™ experience. Zero-G training begins with an exciting scuba diving session with a licensed NASA diver. After which students will construct a habitat or perform essential tasks during this complete underwater training exercise.*

*ISS and Beyond - What's it like living in space? How do astronauts get enough clean water and air? What happens if something goes wrong? Are there alternate sources of energy? How do astronauts communicate and work with peoples from different cultures? Students will participate in SIM (simulated) scenarios, build their own functioning habitat that sustains core areas of life while maintaining cultural and global awareness.*

*NASA Exclusives: Behind the Scenes Reality Tours - Students will tour NASA Johnson Space Center with stops at historic Apollo era Mission Control, ISS Mission Control and the Space Station Mock-up Facility including its full-size training modules of the International Space Station. See rockets up-close that were used in early space program. Experience the space shuttle replica Independence atop the historic Boeing 747 shuttle carrier aircraft NASA 905.*

*Expert Chat - Hear presentations by NASA astronauts with first-hand space exploration experience. Have a unique and exclusive chance to ask questions.*

SAMPLE Weekly Agenda – subject to change:

<b>Sunday</b>	Hotel Check-in
<b>Monday</b>	NASA Johnson Space Center tour, thermal design challenge, Starship Gallery artifacts
<b>Tuesday</b>	Martian habitat challenge
<b>Wednesday</b>	2 Stage rocket construction, robotics design and construction
<b>Thursday</b>	Robotics competition, Neutral Buoyancy Lab tour, scuba dive activity
<b>Friday</b>	Single stage rocket activity, brunch with an astronaut, graduation certificates and medals, rocket launch party
<b>Saturday</b>	Free time and depart for home

(Activities are subject to change without notice due to weather or unforeseen circumstances.)

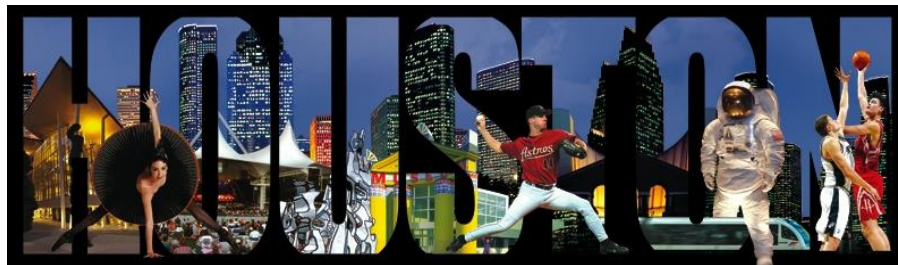
Our NASA program will run from Monday to Friday, from 08:30 to 16:00/30. Coaches will generally pick-up at 17:00 to allow for extra time to view the centre's attractions. Lunches will be at the Zero-G Diner and are included in your package. In the evenings, please know that we encourage you to participate in our evening event program. If you opt to do something different, please let your Ambassador know once you arrive in Houston. They will be able to assist you in achieving best rates for added transportation and extra requirements.

### **Day 7**

Breakfast

Lunch on Own

Good morning Houston! This morning we'll start to say goodbye to this wonderful city! We will wave to our new friends as we leave for the airport and hopefully, take away memories that will last a lifetime!





# Project & Program Descriptions

**DESIGN, BUILD & LAUNCH A ROCKET** - Students will engineer a rocket of their own design, including deciding which rocket parts are needed and what they can afford given their own NASA project. Rockets will be launched at NASA's Johnson Space Center (weather permitting).

**BUILD A ROBOTIC MARS ROVER** – Given a set of parameters and tasks each rover must accomplish on Mars, students must decide how to create a robotic rover. They start with price lists for supplies and given varying criteria, students design, build and test their rover. Teams put their rovers to the test on a Martian landscape competition to locate and retrieve the Martian rocks most valuable to NASA.

**ENGINEER A ROVER LANDER** - During this phase of the mission, teams must design and create a lander which will safely protect its rover payload from the impact of landing on the Martian surface. Payload protection is critical as the success of the rover mission cannot be accomplished if the rover is damaged before it is able to explore Mars. Working within a budget, students must ensure their cargo can withstand the impact of a 3-story drop; as well as, reach a predetermined landing site.

**LOFTING INTO SPACE** - Students will engineer an apparatus capable of carrying all of its rocket pieces safely upwards 2-stories at a 60-degree angle of ascent. Within a budget, students will design and redesign and ascent vehicle methodically and with considerable problem solving.

**STUDENT PRESENTATIONS** - Given information about specific topics, all groups must present the necessary information to accomplish their rocket, rover, landing and lofting projects. Each team will have different, but vital pieces of information which must be shared with all groups in order to ensure success. Since teams do not have the same information, communication is critical! Space Center Houston administration and all teams evaluate presentations for style and content knowledge.

**NASA TOURS** - Several tours are given at Johnson Space Center, highlighting both Mars and project related themes. See historic Mission Control Centers and the Space Station Mock-up Facility with its life-sized models of the International Space Station and Space Shuttle. Visit the Neutral Buoyancy Laboratory where astronauts train for Extravehicular Activities (EVA) in simulated microgravity. See up-close the rockets used in the early space program, as well as experimental X-vehicles.

**TALK TO NASA EXPERTS** - Hear a wide variety of presentations by NASA personnel who are really making space exploration happen. Topics may include: Space Exploration, Rocket Propulsion, Mission Control, the Space Program, the International Space Station, Space Shuttle, Robotics or Space Physiology.

## TEXAS STEM – HOUSTON, USA

### **Minimum Booking Numbers:**

20 students

### **What's Included:**

Round-trip flights with a scheduled carrier  
6-nights' accommodation in destination  
Breakfasts, lunches & dinners starting on Day 2 and ending with Breakfast on Day 7  
Airport transfers and transportation as shown on itinerary  
5-Day NASA Johnson Space Center Master Class Series at Space Center Houston with programming as shown in Detail Itinerary  
Graduation Lunch & Ceremony with Certificate Presentation  
Evening entertainment program  
Space University tote bag & mug  
Dedicated Tour Ambassador  
24-hour emergency cover

### **What's Not Included:**

Fully comprehensive insurance (mandatory)  
Transfers to/from home airport  
Transportation for activities not shown in the itinerary  
Cost of visas, full or collective passports  
Cost of inoculations or medication required for travel  
Sightseeing / Entertainment Options not shown in Itinerary  
Hotel incidental deposits & bills – meals, mini-bar items, recreation charges, purchases billed to room, etc  
Any gratuities – coach drivers, maid / bellman services, area guides, tour ambassador

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**As always, our staff are always available to you to answer any questions you may have regarding programming. If we may serve you in any way, please do not hesitate to contact us.**

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