



North Carolina, USA - www.STEMstudytours.com

Tour: **Math & Money**
Destination: Manhattan, New York
Specialization: Math, Physics, Finance, History & Science
Itinerary: 6-days / 5-nights in New York City

Math & Money - New York City			
Day	Morning	Afternoon	Evening
1	Travel to NYC; transfer to hotel and check in		Dinner & Exploration in Manhattan's Times Square
2	National Museum of Mathematics + 2 Master Classes	Statue of Liberty & Ellis Island + Ellis Island National Immigration Museum with Audio Guides	Dinner & Group Photo
3	Liberty Science Center + 2 Specialty Master Class Options		Dinner & Free Time
4	The NYC Transit Master Class - Construction, Engineering & more	Brooklyn Bridge Walk	Dinner & Empire State Building
5	Wall Street & Financial District Walking Tour	Museum of Finance + 2 Master Classes	Farewell Dinner
6	Free time until departure; travel home		



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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New York City... Immerse yourself in New York City for five minutes and you'll see why it's like no other place on earth. It's why countless people have pinned their dreams on the place, thrown caution to the wind and shown up on its doorstep. And it's why visitors keep streaming in from all corners of the globe, grasping at their silver-screen visions – and finding them – but discovering plenty more on the way. New York is a city that's got so many sides and so much to offer that it can be intimidating at times but visit with an open mind and you're likely to fall in love with this city. The buildings are soaring, look-at-me towers; crowds are boisterous and diverse; zillions of restaurants and shops cater every conceivable taste; museums and performance venues offer everything from masterworks to avant-garde creations. Around almost any corner is a commingling of energy, congruous and clashing at the same time. The result is messy, beautiful, and very New York!



Did you know?

- ✓ The term “Big Apple” originally referred to horse racing! The city got its most famous nickname from a local newspaper’s horse racing column in the 1920s. Prior to the city’s adoption of the nickname, the phrase “Big Apple” was used to describe a big money prize at horse races held around the city.
- ✓ New Yorkers speak approximately 800 languages. Over 37 percent of New Yorkers were born in another country, so it’s unsurprising that the city’s residents speak a wide range of languages—but by any account, 800 is impressive. 4 in 10 households speak a language other than English.
- ✓ Most of us associate cowboys with the Wild West—not the West Side of Manhattan. But from 1850 to 1941, New York’s 10th Avenue had its own special team of cowboys. Responsible for wrangling people rather than cows, the West Side Cowboys would ride on horseback ahead of the freight trains that ran down the middle of the street, warning people to get out of the way.
- ✓ NYCs population is the highest of any American city and a little over 8 million people live in the City. It means 1 in every 38 people in the United States call the city home. With over 27,000 people per square mile, it’s not just the densest major city, it also accounts for more than 40 percent of New York State’s entire population.
- ✓ The Bronx takes its name from its first European settler. Jonas Bronck, who moved to America from Sweden in 1639, was the first European to settle in the Bronx. His farm, covering about 500 acres, was referred to as “Bronck’s Land,” and the river was called “Bronck’s River.” Over the years, people started calling the whole area the “Bronx”.



- ✓ France gifted the Statue of Liberty to the United States in 1886 for its centennial celebration. The statue was shipped as 350 pieces in 214 crates and took 4 months to assemble at its current home on Ellis Island.
- ✓ New York City's Federal Reserve Bank has the largest gold storage in the world. The vault is 80 feet below street level and contains \$90 billion in gold.
- ✓ The first pizzeria in the United States opened in NYC in 1895. Since the 1960s, the price of a slice of pizza has been roughly the same price as a subway ride, generating the idea of "Pizza Principle" among economists.
- ✓ Times Square is named after the New York Times. It was originally called Longacre Square until the Times moved there in 1904.
- ✓ New York City became the first capital of the United States in 1789.

Day 1

Dinner

On arrival in the city, we'll be met at the airport, load our coach and transfer to our hotel. After check-in and getting sorted in our rooms, we will have our **Welcome, Safety & Orientation Meeting**. We'll have our **Welcome Dinner in Times Square** this evening. If you arrive early enough, we'd love to help you plan some activities. There's so much to do in NYC!

Rooming: Typical Manhattan hotel rooms have two full/queen beds and sleep 4 pupils per room. Teachers sleep one person per bed with up to 2 staff in each room. All rooming is based on gender. Please do understand that hotel rooms in NYC are expensive and this is why we always try to maximize occupancy. The most cost-effective times of the year to stay in NYC are January through March; the most expensive times are October and December. Summer can be a great time for hotel rates, but please beware of possible increased airfares if flying.



Times Square Exploration – Times Square is a major commercial intersection, tourist destination, entertainment center and neighborhood in the Midtown Manhattan section of NYC at the junction of Broadway and 7th Avenue. Brightly lit by numerous billboards and advertisements, it stretches from West 42nd to West 47th Streets, and is sometimes referred to as “the Crossroads of the World”, “the Center of the Universe”, “the Heart of the Great White Way”, and “the Heart of the World.” It is one of the world's busiest pedestrian areas, the hub of the Broadway Theater District, and a major center of the world's entertainment industry. Times Square is one of the world's most visited tourist attractions, drawing an estimated 50 million visitors annually. Approximately

330,000 people pass through Times Square daily, many of them tourists, while over 460,000 pedestrians walk through Times Square on its busiest days.

Day 2

Breakfast & dinner included; lunch on own

We'll have an opportunity to dive into Mathematics today with 2 specialty Master Classes. Afterwards, we're off to the Statue of Liberty!

National Museum of Mathematics aka "MoMath" – The Coolest thing that ever happened to Math! The National Museum of Mathematics highlights the role of mathematics in illuminating the patterns and structures all around us. Its dynamic exhibits, gallery and programs are designed to stimulate inquiry, spark curiosity, and reveal the wonders of mathematics. Groups will choose two out of the following 45-minute sessions to participate in:



Topology - Sometimes called "rubber geometry", topology is the study of properties of objects that don't change even when those objects are twisted, stretched, shrunk, and bent. Circles become squares, flat becomes curved, and coffee cups become doughnuts in this amazing branch of math.

Knot Theory - Dating back to prehistoric times, knot theory has been used to record information, create the shelter and transportation methods necessary for survival, and adorn artwork all over the world. In modern life, we encounter knots daily, in more places than just our shoes. Inspired by these everyday knots, mathematical knot theory focuses on knots whose ends are joined together and cannot be undone. Since the 19th century, over six billion knots and links have been classified. Today, knot theory, a branch of topology, is used to help us understand statistical mechanics, quantum computation, pharmaceutical design, and even our own DNA.

Cryptography - By hiding messages in shapes, gibberish, and number codes, cryptography has allowed people, from the time of the ancient Greeks through today, to safely transmit secrets. Court intrigue, star-crossed love, and war have all benefited immensely from this method of communication. These days, cryptographers have traded the cipher disk for the computer screen, but cryptography still influences our life in covert ways. By harnessing statistics, abstract algebra, and other branches of mathematics, cryptography lets us breathe easier when we go to an ATM, create a password for our computer, or send money electronically.

Graph Theory - Graphs can help us study everything from the internet to transportation networks, and from ecological systems to groups of friends. Wherever things are connected or related to each other, graph theory is there. The programs offered in graph theory offer different introductions to the subject, highlighting the intuitive and creative problem solving that makes graph theory so much fun.

Probability - Probability is a way to quantify the likelihood of an event occurring. Students explore this concept through guided interactive experiments and challenges. Some prior exposure to basic probability and familiarity with adding fractions is assumed for these programs.

Next, we're in for a real treat....



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Statue Cruises: Statue of Liberty & Liberty Island exploration, plus the Ellis Island Immigration Museum – Departing from Battery Park, get a chance to see the Statue of Liberty National Monument and the Ellis Island National Immigration Museum in this absolutely fascinating journey. Enjoy an audio tour and get an in-depth look at America's enduring symbol of freedom: **The Statue of Liberty**. Continue to Ellis Island for access to the **Ellis Island Immigration Museum** and free time to explore. Indoor and outdoor seating is available; concessions and souvenirs are available on board. Be sure to wear comfortable clothing and shoes!



This evening, we'll have dinner locally and then meet in Times Square for a **Group Photo!**

Day 3

Breakfast & dinner included; lunch on own

Rise and shine Manhattan! After breakfast at our hotel, we'll head to the Metro station, transferring to lower Manhattan and onto the New Jersey PATH system to take us to the Liberty Science Center.



The Liberty Science Center – At LSC, your students will be inspired to learn about the power, promise, and pure fun of science, math, engineering and technology. LSC's hands-on extended laboratory programming offers high-quality, interdisciplinary project-based learning that combines critical thinking, collaboration, and problem-solving skills using real world examples to help support students in making the connection to learning. Students will strengthen the tools and skills necessary for scientific study into math and science connections as well as the world of medical technology and engineering during STEM instructor led facilitated classroom discussions and experiments.

While here, please know that you may have your choice of 2 Master Classes. Here are options:

- ✚ **Intro to Game Design** - Design custom characters with animations and behaviors by completing a crash course in Stencyl. This intuitive toolset is limited only by your creativity. This platform sets a foundation of computational thinking—an essential skill in today's tech-driven world.



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- ✚ **Unreal Creations! Designing a Game with Unreal Engine** - Level up your skills in this game design and programming primer course using industry-level tools! Take the first step into professional-level game design as you learn how to set up your first project in Unreal Engine and learn the basics of coding in C++. Some programming experience is recommended for this class.
- ✚ **Advanced 3D Modeling with Autodesk Maya** - In this program exploring advanced 3D modeling, students will learn the techniques and methods used professionally to create 3D models and meshes. Students will leave with access to a digital model that they have created (requires access to a Google Drive account or similar file-storage service).
- ✚ **Virtual Reality and Your Brain** - Ever want to know what it would be like to stand on an I-beam a few hundred feet in the air without safety gear? Using HTC Vive and other tools, students will learn how their brain perceives reality and why VR is such an immersive technology.
- ✚ **Bridge Engineering: Engineering & Design Challenge** - Your group will be engaged in advanced 3D design of bridges with Autodesk Tinkercad. Learn to work in collaborative groups to solve complex problems using 3D printers.
- ✚ **Physics of Car Crashes** - Explore the physics of car crashes and safety devices through the study of varying types of collisions (elastic and inelastic), force, and impact time. This exploration will guide your students to use Vernier sensors to engineer and analyze their own device which will survive the impact of a 'crash.'
- ✚ **Sphero Rovers: Mission to Mars!** - Can you create the next Mars rover design? In this program use your engineering and design skills to create a Sphero driven rover that can carry a payload across our simulated Mars surface. Once you have designed your rover, jump into the driver's seat and code your way through the tricky terrain!
- ✚ **Aviation: From Paper Airplanes to Drones** - This is drone training 101. Learn basic concepts of flight and apply this knowledge through hands-on experiences like using flight experiments and micro pocket drones.
- ✚ **Stabilizing the System** - Learn about homeostasis and feedback mechanisms as you use Vernier sensors to observe and analyze your own heart rate, lung capacity, blood pressure, and more.
- ✚ **Our Water Systems: What's in Our Water?** - Where does the water we use come from, where does it go, and what happens to it along the way? Students explore our water systems through a gallery format, becoming an "expert" on a contributing aspect such as eutrophication, combined sewage overflow, pH levels, and marine life in New York Harbor. Students then test local water from the Hudson River as well as our tap water, comparing the results to EPA guidelines.
- ✚ **Unlocking Your DNA** - Discover the world of genetics as you explore the human genome. Use hands-on lab techniques and lab equipment such as micro-pipettes, centrifuges, and gel electrophoresis chambers as you solve a genetic mystery.
- ✚ **Forensic Anthropology** - Tibia or not tibia, that is the question! Learn to observe and identify the bones and features that make us unique. Tell the story of a human by reading the patterns in various skeletal features. Then, solve an archaeological crime by using clues dug up from Earth to determine whether you're dealing with a funeral or a fraud.

After our thrilling day, we'll head back to Manhattan for dinner and free time.



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Day 4

Breakfast & dinner included; lunch on own

Today we'll be exploring the NYC Transit Operations, walking the Brooklyn Bridge and discovering the Intrepid Sea, Air & Space Museum before having dinner in Manhattan.



The NYC Transit Museum – The Transit Museum is dedicated to telling and preserving the stories of mass transportation—extraordinary engineering feats, workers who labored in the tunnels over 100 years ago, communities that were drastically transformed, and the ever-evolving technology, design, and ridership of a system that runs 24 hours a day, every day of the year. While here, we'll browse the museum and have an opportunity to participate in a 75-minute Master Class, offered from **September to June**. Teachers will select their workshop of choice prior to arrival. Options include:

The Extended Tour - Discover the magnitude and complexity of New York City's public transportation system by exploring elements of construction, social history, engineering and impact over time in this introduction to transit history.

Immigration in Transportation - From the immigrant workforce who built the subway to transportation's influence on neighborhood development, the story of this diverse City comes alive through discussion, photographs, and subway stories.

Sustainability - One city, one fare, one community of riders. Investigate the environmental, social, and economic sustainability of transportation over time using the Museum's vintage train cars, collections, and exhibits that tell the story of moving the masses.

Afterwards, put on your walking shoes, we're going to trek an incredible marvel of innovation – The Brooklyn Bridge!

The Brooklyn Bridge – We'll walk across the Brooklyn Bridge to explore and delight in this monumental structure, not only from the physics and engineering viewpoint, but also as an enduring work of human achievement. Since construction first started in 1860, it has inspired poets, artists and writers. As always, any story of epic engineering also comes with a human story equal in depth. We'll learn about the Roebling family and their tenacious 13-year battle to begin and then complete the longest and heaviest suspension bridge ever built. We'll explore the bridge to discuss and observe just how John Roebling's masterpiece was built.



Next up, let's take a look at some amazing physics!



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Intrepid Sea, Air & Space Museum - The Intrepid Sea, Air & Space Museum is a unique journey through all things military and maritime, with spectacular interactive exhibits. Located at Pier 86, the complex boasts authentically restored vessels, the most impressive being the World War II aircraft carrier the USS Intrepid and the submarine USS Growler. You'll also spy a British Airways Concorde, as well as Sikorsky, Skyhawk, and Vietnam-era Iroquois Huey helicopters. As for space memorabilia, the Space Shuttle Pavilion showcases the Enterprise, the first space shuttle. You can also visit a replica of an Aurora capsule and try out the virtual flight zone, which simulates the exhilaration of flying in a supersonic jet. While here, students will participate in a specialized tour.



Aviation Physics Master Tour– This tour explores the aircraft carrier *Intrepid* and examines the machinery that makes flight at sea possible. In hands-on activities, students work in groups to demonstrate the physics of flight and how those forces interact with one another.

In the evening, after dinner we're off to explore the stunning view from the Empire State Building.



The Empire State Building - New York's famous Empire State Building, a New York City and National Historic landmark, soars more than a quarter of a mile into the atmosphere above the heart of Manhattan. Located on the 86th floor, 1,050 feet (320 meters) above the city's bustling streets, the Observatory offers an immersive experience with panoramic views from within a glass enclosed pavilion and from the surrounding open-air promenade. The building, one of New York City's main tourist attractions, offers a variety of activities. Check out the two-story building model and stunning art deco ceiling murals along with the historical "Dare to Dream" exhibit. There are restaurants, a sushi bar, coffee shops, a drug store, a post office and two banks in addition to the plethora of restaurants and nightlife activities in the surrounding area.

The Observation Deck wraps around the building's spire, providing 360-degree views of New York and beyond. From up here you'll get one-of-a-kind views of Central Park, The Hudson River and East River, The Brooklyn Bridge, Times Square, The Statue of Liberty, and much more. Their official Observatory Experience app teaches you about your view from every direction. Then, take advantage of the high-powered binoculars to get a closer look!

Day 5

Breakfast & dinner included; lunch on own

Today is all about finance. We'll explore the world of money in a Wall Street Walking Tour followed by a visit to the Museum of Finance with a Master Class workshop.



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Wall Street & the Financial District Walking Tour – As insiders, our guides have many stories to share from the trenches of Wall Street. They put faces and events to the buildings and landmarks to personify and demystify Wall Street. Meandering the narrow, winding streets of lower Manhattan, you'll hear stories that will entertain, inform and shock. Learn about 400 years of history that led to modern Wall Street from the Dutch trading outpost to the humble beginnings of the NYSE to the current financial markets. The itinerary includes the New York Stock Exchange, Wall Street Federal Hall, House of Morgan, 40 Wall Mercantile Exchange, Cotton Exchange Pearl Street, Deutsche Bank, Lehman Brothers, Goldman Sachs, Charging Bull, Bowling Green, Canon of Heroes, Trinity Church and the Federal Reserve.

In the afternoon, we're off to explore the world of money!

The Mu\$eum of Finance - Financial success and ruin; the excitement of a trading floor; getting a leg up on investing through information; entrepreneurship; the origins of money and counterfeiting; the life of Alexander Hamilton. These are just some of the topics that will be shared with you and your students during a visit to the Museum of American Finance. The Museum provides students with an opportunity to delve into important historical topics and current financial events through exhibits of historical documents, financial artifacts, short original movies and contemporary, interactive materials.

Your visit to the Museum and the following Curriculum Guides will allow students to hone critical thinking skills, gain historical context, learn about America's financial history and begin to plan their own financial futures.

[Curriculum Guide: The Financial Markets](#)

[Curriculum Guide: Money](#)

[Curriculum Guide: Banking in America](#)

[Curriculum Guide: Entrepreneurs](#)

[Curriculum Guide: Alexander Hamilton](#)

Schools will have an opportunity to participate in two of the following Master Class options which teachers will select prior to travel. Classes are approximately 45-minutes to an hour in length and subject to change.

Banking in America – This lesson, based on the Museum's "Banking in America" exhibit, will help students understand why banks today are safe places to deposit money, how banks earn profits, why banks are important to the overall economy and what role the Federal Reserve plays in our banking system.

Booms, Bubbles & Busts – Takes students through the history of financial bubbles focusing on the United States. Students learn about the cyclical pattern of bubbles, common causes and how the economy adapts and regulates. Seen through the lens of editorial cartoons from the Museum's collection as well as other sources, students learn both how to interpret political cartoons and how to find common threads through history to identify booms and busts. This course is only for advanced students (11th and 12th grades / UK A-levels) with a background in US History, Economics or Finance.

Financial Markets 1 - This is an introductory class to the three main asset classes: stocks, bonds and commodities. The class covers the creation and mechanics of each asset class. In addition, students learn how financial products are used by individuals and companies to help them run their existing businesses or grow into the future.

How to Analyze a Stock - This classroom lesson will teach students who are new to investing how to analyze a stock. Upon completion, students will have a basic understanding of stocks and the stock market, as well as the



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ability to go beyond beginner techniques used to pick stocks. By learning the P/E (Price/Earnings) and PEG (Price/Earnings/Growth) ratios, students will learn the basics of how to apply research data in determining if a stock price is considered “fair.”

Mint Condition: A World History of Coins - If money doesn't grow on trees, where does it come from? What is it made of? How is it made? Why does it look the way it does? Why does it keep getting... smaller? Collecting expert Harley Spiller shares how he discovered the many rules that govern our money, as well as the fascinating techniques and technologies used to protect money from counterfeiting. He brings the subject to life with his own personal experiences with money, as well as many examples of old, unique and interesting coins and objects once used as money. Will you know it when you see it?

The History of American Money - This classroom lesson, based on the Museum’s Money Room exhibit, will help students understand the evolution of money in America including how the change from many different bank-issued notes to one federal currency helped unify the country. Students will also learn about how the Bureau of Engraving and Printing protects against counterfeiting.

Open Outcry: Trading Then & Now - This class is designed to teach students the mechanics of trading markets, the interplay between profit-seeking individuals and the economics of market pricing. Students are divided into groups of buyers and sellers, and then they interact with each other in a mock trading session. Profits and losses are totaled after each trading session, and trends are identified. Finally, there is a discussion of the contrast between historic and modern market participation due to developments in electronic trading.

The Secret Life of Money - Harley Spiller, a museum professional and collections expert, presents his mind-boggling collection of unusual artifacts and little-known information from the world of currency and coins. Learn to protect yourself against dishonesty, discuss strategies used by the visually impaired, and see how nations of the world put their best foot forward on their paper money. Use magnet detectors, ultra-violet lights, and other anti-counterfeiting devices as Spiller reveals the active ingredient in counterfeit-detecting markers and other secrets behind U.S. currency. Handle his extraordinary collection of unusual government misprints, offbeat bills and coins, and notes designed or altered by important modern artists.

Your Money and Your Success - This course demonstrates why being financially savvy helps gain a competitive advantage in the workplace and in life. Topics include practical information about banking, budgeting, credit, and building financial disciplines that prepare young people for managing their money as they enter the working world. Topics include setting goals for the short-term and long-term, the basics of making a budget, using on-line tools to gain an advantage, determining banking needs and using bank products, the importance of credit and managing credit (the role of credit reports and credit scores) and using credit cards responsibly.

This evening we’ll have our Farewell Dinner and then free time for one last look at stunning Manhattan by moonlight.

Day 6

Breakfast included but dependent upon departure time

Today we’ll end our tour with free time in the morning (dependent upon flight/transfer timings) and then traveling home, taking memories away with us that will last forever.



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MATH & MONEY

Minimum Booking Numbers:

20 students

What's Included:

Roundtrip flights or motorcoach transfers
5-nights' accommodation in Manhattan
Airport motorcoach transfers
Group metro transportation (for daily activities)
Meals in destination – Breakfasts & dinners daily starting with dinner on arrival and ending with breakfast on departure
National Museum of Mathematics + 2 Master Classes
NYC Transit Museum + Master Class
Liberty Science Center + 2 Master Classes
Wall Street & the Financial District Walking Tour
Museum of Finance + 2 Master Classes
Brooklyn Bridge Walk
Intrepid Air, Sea & Space Museum + Master Class Tour
State of Liberty & Ellis Island Museum excursions with Audio Guides
Empire State Building – Evening view
Times Square Excursion
Personal Tour Ambassador
Fund-a-Forest: A tree is planted in the name of each guest
Dollar\$ For Scholars: \$2 donation in the name of each guest
24-hour emergency cover

What's Not Included:

Fully comprehensive insurance (mandatory)
Transfers to/from home airport
Lunches and snacks/beverages other than at meal times
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, purchases billed to room, etc.
Any gratuities – drivers, hotel services, Ambassador, local guides

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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