NATIONAL SECURITY AGENCY

K-12 OUTREACH PRESENTATIONS

UPDATED: JANUARY 2023

WMJ_0113

STEM ENRICHMENT

SUBJECT	PRESENTATION	RECOMMENDED GRADES		TIME	VIRTUAL	IN-PERSON
Mathematics	Buried Treasure	K 1 2 **3 4 5** 6 7 8 9 10 11 12	3-5	45	✓	✓
Mathematics	But Who's Counting?	K 1 2 **3 4 5 6 7 8** 9 10 11 12	3-8	45		✓
STEM	Careers at NSA	K 1 2 3 4 5 6 7 **8 9 10 11 12**	8-12	45-60	✓	✓
Mathematics	Cryptanalysis 101	K 1 2 3 **4 5 6 7 8 9 10** 11 12	4-10	45-60	✓	✓
Mathematics	Cryptoball	K 1 2 3 4 5 **6 7 8 9 10** 11 12	6-10	45-60		✓
Mathematics	Cryptowheel	K 1 2 **3 4 5** 6 7 8 9 10 11 12	3-5	30	✓	✓
Technology	Cyber Careers	K 1 2 3 4 5 **6 7 8 9 10 11 12**	6-12	45	✓	✓
Technology	Cyber Safety 101	K 1 2 3 **4 5 6 7 8 9 10 11 12**	4-12	45	✓	✓
Technology	Defending our Nation in Cyberspace	K 1 2 3 4 5 6 7 **8 9 10 11 12**	8-12	45-60	✓	✓
Mathematics	Experimenting with Chance	K 1 2 3 **4 5 6 7 8** 9 10 11 12	4-8	60	✓	✓
Mathematics	Fermat's Last Theorem	K 1 2 3 4 5 6 7 **8 9 10 11 12**	8-12	60	✓	✓
STEM	Find Your Best Path	K 1 2 3 4 **5 6 7 8 9 10** 11 12	5-10	45	✓	✓
Mathematics	Fractals: The Art of Math	K 1 2 3 **4 5 6 7 8** 9 10 11 12	4-8	60	✓	✓
Technology	Fractals: The Art of Math and Computer Science	K 1 2 3 4 5 6 7 **8 9 10 11 12**	8-12	60	✓	✓
Mathematics	Gold Bug	K 1 2 3 4 **5 6 7 8 9 10** 11 12	5-10	60	✓	✓
Technology	How to Talk Like a Computer	K 1 2 3 4 5 **6 7 8** 9 10 11 12	6-8	30		✓
Mathematics	Manipulating Math	K 1 2 3 4 **5 6 7 8 9 10 11 12**	5-12	45-60		✓

SUBJECT	PRESENTATION	RECOMMENDED GRADES	TIME	VIRTUAL	IN-PERSON
Engineering	Marshmallow Tower Challenge	K 1 2 3 **4 5 6 7 8 9 10 11 12**	4-12	60	
Mathematics	Mission Possible	K 1 2 3 4 **5 6 7 8** 9 10 11 12	5-8	60	
Technology	NSA Cyber Awareness Challenge	K 1 2 3 4 5 6 **7 8 9 10 11 12**	7-12	60	✓
Mathematics	Operations Research	K 1 2 3 4 5 6 7 8 9 **10 11 12**	10-12	45-60	✓
Mathematics	Pascal's Triangle	K 1 2 3 **4 5 6 7 8** 9 10 11 12	4-8	45-60	
Technology	Programming with Ozobot Evo	K 1 2 **3 4 5 6 7 8 9 10 11 12**	3-12	45-60	
Mathematics	Skittles Guessing Game	K 1 2 **3 4 5** 6 7 8 9 10 11 12	3-5	45	✓
Mathematics	Winning Games: Luck or Logic?	K 1 2 3 4 5 **6 7 8 9 10** 11 12	6-10	45	✓
STEM	Panel Discussion	K 1 2 3 4 5 **6 7 8 9 10 11 12**	6-12	45-60	✓
STEM	Table Activities	K 1 2 **3 4 5 6 7 8 9 10 11 12**	3-12	varies	

SUBJECT	PRESENTATION	RECOMMENDED GRADES	TIME	VIRTUAL	IN-PERSON
LANGUAGE ENRICHMENT					
Language	Arabic: Write to Left	K 1 2 **3 4 5 6 7 8** 9 10 11 12	3-8	45-60	✓
Language	Careers at NSA	K 1 2 3 4 5 6 7 **8 9 10 11 12**	8-12	45-60	✓
Language	Chinese Logic	K 1 2 **3 4 5 6 7 8** 9 10 11 12	3-8	45	✓
Language	Chinese New Year	K 1 2 **3 4 5 6 7 8 9 10 11 12**	3-12	30	✓
Language	Find Your Best Path	K 1 2 3 4 **5 6 7 8 9 10** 11 12	5-10	45	✓
Language	Panel Discussion	K 1 2 3 4 5 **6 7 8 9 10 11 12**	6-12	45-60	✓
Language	Table Activities	K 1 2 **3 4 5 6 7 8 9 10 11 12**	3-12	varies	

STEM ENRICHMENT

BURIED TREASURE

3-5 | 45 MINS

MATHEMATICS

A wonderful introduction to cryptology! Students are challenged to help Grandpa decode a secret message to find where a buried treasure is located. Students are introduced to the logic and math behind code breaking.

BUT WHO'S COUNTING?

3-8 | 45 MINS

MATHEMATICS

Students play a game to create numbers based on the spin of the wheel! The talks reinforces mathematic concepts of place value and probability.

CAREERS AT NSA

8-12 | 45-60 MINS

STEM

Is your school hosting a career day? Students are introduced to NSA's core missions and the diverse careers available at NSA, emphasizing the technical skills of the workforce. A focus on STEM, Cybersecurity or Foreign Language careers is available upon request.

CRYPTANALYSIS 101

4-10 | 45-60 MINS

MATHEMATICS

Students learn basic cryptology terminology and four classic encryption techniques plus the mathematics behind the cryptanalysis (frequency counts and cipher patterns). Students decrypt several messages using substitution and transposition techniques.

CRYPTOBALL

6-10 | 45-60 MINS

MATHEMATICS

Students are introduced to substitution and transposition encryption methods by encoding and decoding messages. The students play an indoor football-like game where the offensive team creates a secret code to designate which player will receive the pass. Students on the defensive team are challenged to 'think outside the box' to break the code to intercept the ball.

CRYPTOWHEEL

3-5 | 30 MINS

MATHEMATICS

Elementary aged students are introduced to basic substitution encryption by using a cipher wheel to slide the alphabet to encrypt and decrypt secret messages.

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CYBER CAREERS

6-12 45 MINS

TECHNOLOGY

What is Cyber Security? What career paths exist for majoring in a Cyber discipline? Students will learn about the importance of cyber security in the real world, be introduced to multiple Cyber work roles, and understand how cyber professionals have impacted recent security breaches.

CYBER SAFETY 101

4-12 45 MINS

TECHNOLOGY

Smartphones, computers, tablets, laptops, the internet, social media, and email, all these communication devices and platforms are everywhere and ever-changing. Do your students understand the possible threats in the cyber world? This talk introduces cybersecurity principles to increase students' knowledge about safely navigating the internet and social media platforms plus provides cyber safeguards when using personal devices.

DEFENDING OUR NATION IN CYBERSPACE

8-12 45-60 MINS

TECHNOLOGY

How are you protecting yourself from threats in cyberspace? What are the most prominent cyberspace threats? What is the evolution of cyber threats and how is NSA protecting national assets and networks against unwarranted cyber activity? Students partake in a "Day in the Life" activity outlining the many NSA roles necessary to work together to detect, analyze, interpret, and provide solutions for a typical cyber incident.

EXPERIMENTING WITH CHANCE

4-8 60 MINS

MATH/SCIENCE

Students examine the concept of probability by exploring the scientific method. The ideas of testing hypotheses, collecting data by simulation, and empirical probability will be emphasized. Pairs of students will perform statistical experiments to test their hypotheses regarding the results.

BACK TO LIST

FERMAT'S LAST THEOREM

MATHEMATICS

8-12

60 MINS

Fermat's Last Theorem is a demonstration of the differences among a conjecture, a proof, and a theorem. In Number Theory, Fermat's Last Theorem states that no three positive integers a, b, and c can satisfy the equation $a^n + b^n = c^n$ for any integer value of n greater than two. Students are offered two potential 'answers' and are asked to prove or disprove these solutions, demonstrating the rigor a proof must meet.

FIND YOUR BEST PATH

MATHEMATICS

5-10

45 MINS

Find Your Best Path challenges students to begin thinking about possible career paths, based on activities they currently enjoy. Students are introduced to career opportunities in Mathematics, Signals Analysis, Computer Science, Language Analysis, Engineering/Physical Science, and Intelligence Analysis, along with things they can do now to explore and prepare.

FRACTALS: THE ART OF MATH

MATHEMATICS

4-8

60 MINS

Students are introduced to fractals; geometric objects created by endlessly repeating patterns. Students draw their own fractals and learn where fractals can be found in everyday life. This talk targets students whose interests lie more in the arts than in math as it connects art and nature to math without focusing upon numbers and equations.

FRACTALS: THE ART OF MATH AND COMPUTER SCIENCE

TECHNOLOGY

8-12

60 MINS

This advanced version of *Fractals: The Art of Math* includes additional math concepts and basic elements of computer science to the discussion. Students are introduced to recursive algorithms and coding in Postscript and Python.

GOLD BUG

MATHEMATICS

5-10

60 MINS

Edgar Allen Poe's "The Gold Bug" is a fascinating story of pirates and buried treasure. Students use the content from the story to decrypt the secret message and find Captain Kidd's hidden treasure.

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HOW TO TALK LIKE A COMPUTER

TECHNOLOGY

6-8

30 MINS

Computers, cell phones, and other electronic devices communicate constantly but how? Students examine ASCII, the underlying character encoding system, and binary, the base-2 number system, which are essential for computer communications. Students explore how to count and interpret binary numbers then practice examples using the binary system.

MANIPULATING MATH

MATHEMATICS

5-12

45-60 MINS

The study of statistics is mathematically rigorous, but the statistics themselves can be used, often incorrectly, in non-mathematical ways. Advertisers may present statistics that are taken out of context, based on too small a sample size or misleading questions. Students become smarter consumers by learning how statistics can be misused to sway consumer opinions.

BACK TO LIST

MARSHMALLOW TOWER CHALLENGE

ENGINEERING

4-12

60 MINS

Bring the Marshmallow Tower Challenge to your classroom! Ignite your students' engineering and leadership skills while exploring teamwork, engineering design, prototyping, success, and failure. Working in small groups, students are challenged to create a standalone structure using limited materials. How high will each team's tower reach?

MISSION POSSIBLE

MATHEMATICS

5-8

60 MINS

Your mission, should you choose to accept it, is to recover the secret code to open a 'top-secret' briefcase. Students join an elite group of cryptanalysts and are trained on two cryptography decryption techniques. Students work in teams to decrypt messages then work together to discover the secret code to open the briefcase.

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NSA CYBER AWARENESS CHALLENGE

TECHNOLOGY

7-12

60 MINS

Students will participate in hands-on activities designed to expose them to STEM topics beyond traditional curriculum offerings. Focus will be on cybersecurity skills introduced in real-world scenarios. Schools within 50 miles of Fort Gordon have the option of In-Person delivery; activities outside of this region will be delivered virtually. Two options are available for the 2022-2023 school year:

- Cyber Awareness – Malware
- Cyber Awareness – Forensics

Every student will need access to a computer with internet access and a keyboard, a monitor larger than 12 inches, and be familiar with Microsoft Windows for the Malware Challenge and Linux for Forensics. Students do not need extensive technical knowledge or a background in cybersecurity.

NOTE: This is a pilot program, and capacity is limited. Please identify an alternate talk from our catalog in the event that we are unable to support your desired timeframe.

OPERATIONS RESEARCH

MATHEMATICS

10-12

45-60 MINS

Operations Research uses advanced analytical methods to help make better decisions. Students use multiple criteria decisions to help select the best college based on their desired criteria: academics, location, costs, financial aid and social life.

PASCAL'S TRIANGLE

MATHEMATICS

4-8

45-60 MINS

Blaise Pascal, a renowned 17th Century mathematician, is credited with discovering Pascal's Triangle, a collection of integers arranged in a triangular fashion and easily computed using only simple addition. Students learn the amazing mathematical properties of Pascal's Triangle and how it can used to quickly solve common everyday math calculations.

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PROGRAMMING WITH OZOBOT EVO

TECHNOLOGY

3-12

45-60 MINS

Bring digital concepts to life with Ozobots, tiny robots that give students immediate feedback on their programming efforts. Students practice computational and sequential thinking as they make Evo dance, spin, and put on a light show. Ozobots can be programmed screen-free using color codes (recommended for younger students only), or using block-based programming that is beginner-friendly but increases in complexity based on student ability. Block-based programming requires computers with internet connectivity for each student.

SKITTLES GUESSING GAME

MATHEMATICS

3-5

45 MINS

Students use fun-sized bags of Skittles to explore the important mathematics concepts of estimation, prediction, sorting, and arithmetic.

WINNING GAMES: LUCK OR LOGIC

MATHEMATICS

6-10

45 MINS

Students are introduced to the basic concepts of game theory. They play familiar games such as tic-tac-toe and rock-paper-scissors and examine the strategies required to win or avoid losing. Students are also introduced to variations on these games and must extend their analysis to determine how to adapt winning strategies.

STEM PANEL DISCUSSION

STEM

6-12

45-60 MINS

Facing up to one million unfilled STEM positions in 2023, the US has a critical need for future STEM professionals. This panel will explore the variety of STEM jobs available at NSA, the diverse career paths taken to secure a STEM job, and opportunities NSA provides for students (scholarships, high school work study, internships). This talk can also be tailored to your specific STEM discipline.

STEM TABLE ACTIVITIES

STEM

3-12

VARIES

Invite NSA to your next STEM Day/Night or similar event. NSA professionals will guide your students through a variety of hands-on activities, designed to engage students for about 10 minutes at a time. Depending on grade range, activities may include cryptograms, introductory coding activities/ sequential thinking, logic problems, engineering, and circuits. For high schools, information about NSA's student programs is also available.

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LANGUAGE ENRICHMENT

ARABIC: WRITE TO LEFT

3-8

45-60 MINS

LANGUAGE

Students are introduced to the Arabic language and the different parts of the world where Arabic is spoken. Students will have an opportunity to practice writing and speaking simple phrases, and learn about a career as a language analyst.

CAREERS AT NSA

8-12

45-60 MINS

LANGUAGE

Is your school hosting a career day? Students are introduced to NSA's core missions and the diverse careers available at NSA, emphasizing the technical skills of the workforce. A focus on STEM, Cybersecurity or Foreign Language careers is available upon request.

CHINESE LOGIC

3-8

45 MINS

LANGUAGE

Chinese characters deciphered! Each picture has a meaning and by recognizing these pictures and combining them, the students will guess the meanings of new words. Through games, logic, and problem-solving, students will realize that learning a new language is fun.

CHINESE NEW YEAR

3-12

30 MINS

LANGUAGE

Why are there different animals associated with each Chinese New Year? Students will learn about the origin and the customs of the Chinese New Year, the character traits associated with the current year, and have fun learning the year's lucky greetings and phrases.

FIND YOUR BEST PATH

5-10

45 MINS

LANGUAGE

Find Your Best Path challenges students to begin thinking about possible career paths, based on activities they currently enjoy. Students are introduced to career opportunities in Language Analysis, Intelligence Analysis, Mathematics, Signals Analysis, Computer Science, and Engineering/Physical Science, along with things they can do now to explore/prepare.

BACK TO LIST

LANGUAGE ANALYST PANEL DISCUSSION

LANGUAGE

6-12

45-60 MINS

Language analysts come from a variety of backgrounds and include both civilian and military personnel. Students will hear panel members talk about the different paths they took to become a language analyst at NSA and highlight the importance of knowing a foreign language. Question and answer time will follow the panel presentation. This talk can also be tailored to your needs.

TABLE ACTIVITIES

LANGUAGE

3-12

VARIES

Is your school planning an International Day/Night or similar event? NSA has a variety of hands-on activities, designed to engage students for about 10 minutes at a time. Available activities include cultural items and other activities to introduce students to a variety of world languages and cultures. For high schools, information about NSA's student programs is also available.

NOTE: Please use the Events form to request table activities for your event.

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