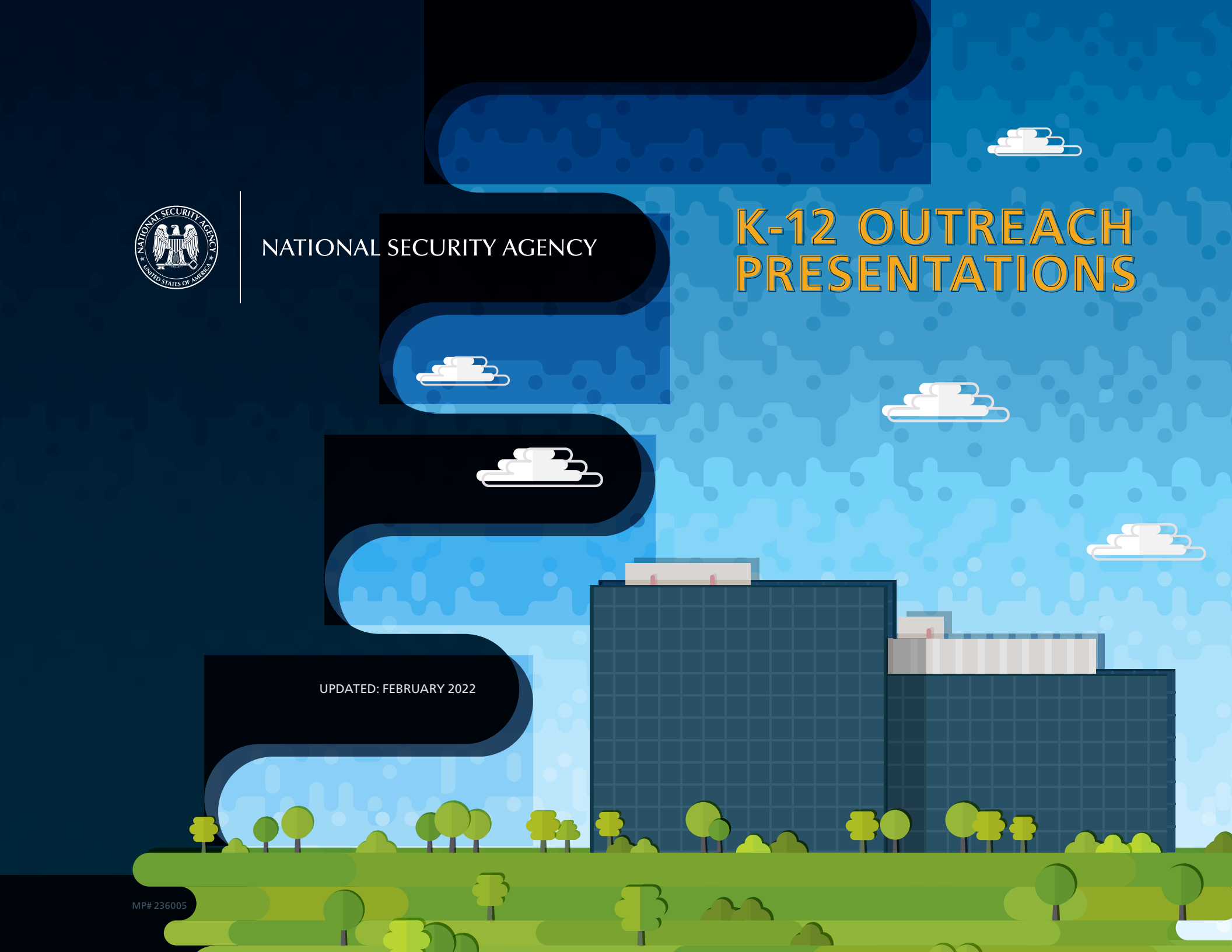
NATIONAL SECURITY AGENCY

K-12 OUTREACH PRESENTATIONS

UPDATED: FEBRUARY 2022



MP# 236005

STEM

SUBJECT	PRESENTATION	RECOMMENDED GRADES		TIME	FORMAT
Mathematics	But Who's Counting?	K 1 2 **3 4 5 6 7 8 9 10 11 12**	3-5	45	
Mathematics	Buried Treasure	K 1 2 3 **4 5** 6 7 8 9 10 11 12	4-5	45	
STEM	Careers at NSA	K 1 2 3 **4 5 6 7 8 9 10 11 12**	4-12	45-60	
Mathematics	Cryptanalysis 101	K 1 2 3 **4 5 6 7 8 9 10** 11 12	4-10	50	
Mathematics	Cryptoball	K 1 2 3 4 5 **6 7 8 9 10** 11 12	6-10	60	
Mathematics	CryptoWheel	K 1 2 3 **4 5** 6 7 8 9 10 11 12	4-5	30	
Technology	Cyber Careers	K 1 2 3 4 5 **6 7 8 9 10 11 12**	6-12	50	
Technology	Cyber Safety 101	K 1 2 3 4 5 **6 7 8 9 10 11 12**	6-12	45	
Technology	Defending our Nation in Cyberspace	K 1 2 3 4 5 6 7 **8 9 10 11 12**	8-12	50	
Mathematics	Experimenting with Chance	K 1 2 3 **4 5 6 7 8** 9 10 11 12	4-8	45	
Mathematics	Fermat's Last Theorem	K 1 2 3 4 5 6 7 **8 9 10 11 12**	8-12	60	
Mathematics	Fractals: The Art of Math	K 1 2 3 **4 5 6 7 8 9 10 11 12**	4-12	60	
Mathematics	Gold Bug	K 1 2 3 4 **5 6 7 8** 9 10 11 12	5-8	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**	6-12	50	
Engineering	Marshmallow Tower Challenge	K 1 2 3 **4 5 6 7 8 9 10 11 12**	4-12	55	
Mathematics	Mission Possible	K 1 2 3 4 **5 6 7 8** 9 10 11 12	5-8	60	
Mathematics	Operations Research	K 1 2 3 4 5 6 7 8 9 **10 11 12**	10-12	50	
Mathematics	Pascal's Triangle	K 1 2 3 **4 5 6 7 8** 9 10 11 12	4-8	50	

Subject	Presentation	Recommended Grades	Time	Format
Mathematics	Patterns and Number Sequences	4-8	50	
Mathematics	Skittles	3-5	45	
Mathematics	Winning Games: Luck or Logic?	6-10	45	
STEM	Panel Discussion	4-12	45-60	

SUBJECT	PRESENTATION	RECOMMENDED GRADES	TIME	FORMAT
LANGUAGE				
Language	Arabic: Write to Left	3-8	45-60	
Language	Careers at NSA	4-12	30	
Language	Chinese Logic	3-8	45	
Language	Chinese New Year	3-12	30	
Language	Panel Discussion	4-12	45-60	

STEM ENRICHMENT

BUT WHO'S COUNTING?

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

BURIED TREASURE

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.

CAREERS AT NSA

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

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

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

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

BACK TO LIST

CYBER CAREERS

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

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

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

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.

FRACTALS: THE ART OF MATH

MATHEMATICS 4-12 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.

GOLD BUG

MATHEMATICS 5-8 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.

HOW TO TALK LIKE A COMPUTER

TECHNOLOGY 4-12 60 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 6-12 45 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 6-12 45 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.

OPERATIONS RESEARCH

MATHEMATICS 10-12 55 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 50 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.

PATTERNS AND NUMBER SEQUENCES

MATHEMATICS 4-8 50 MINS

Patterns are at the heart of math. Understanding patterns prepares students for learning complex number concepts and mathematical operations. Students are introduced to patterns by examining various arithmetic sequences and determining the rule for generating each sequence. Students learn about properties of the English language and use pattern-identifying skills to decrypt a secret message.

BACK TO LIST

SKITTLES

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

WINNING GAMES: LUCK OR LOGIC

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

Facing up to one million unfilled STEM positions in 2022, 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.

BACK TO LIST

LANGUAGE ENRICHMENT

ARABIC: WRITE TO LEFT

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

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

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

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.

LANGUAGE ANALYST PANEL DISCUSSION

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.

BACK TO LIST