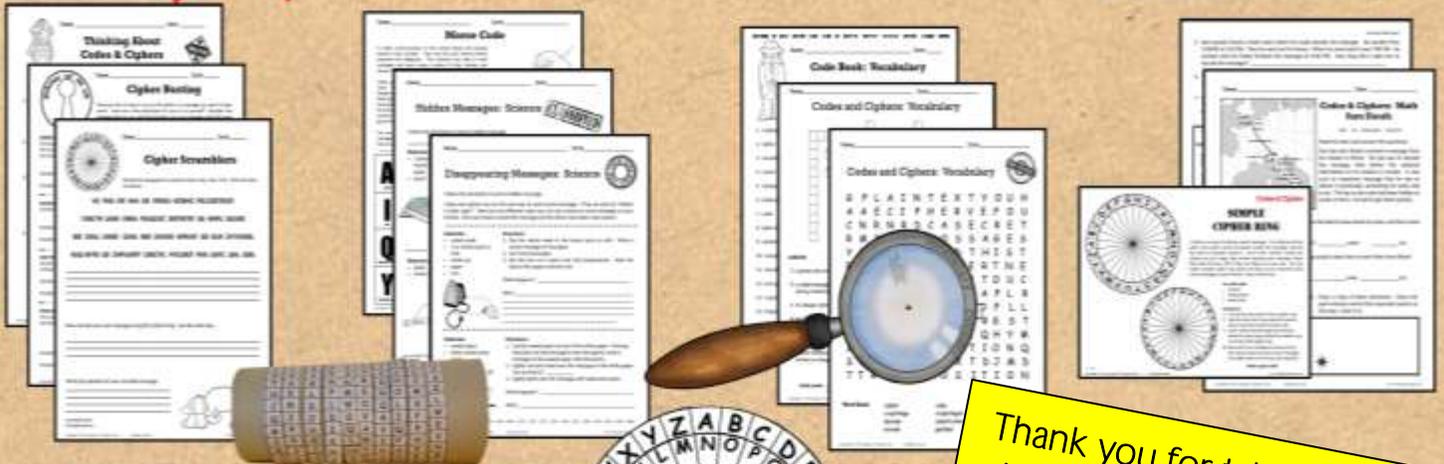
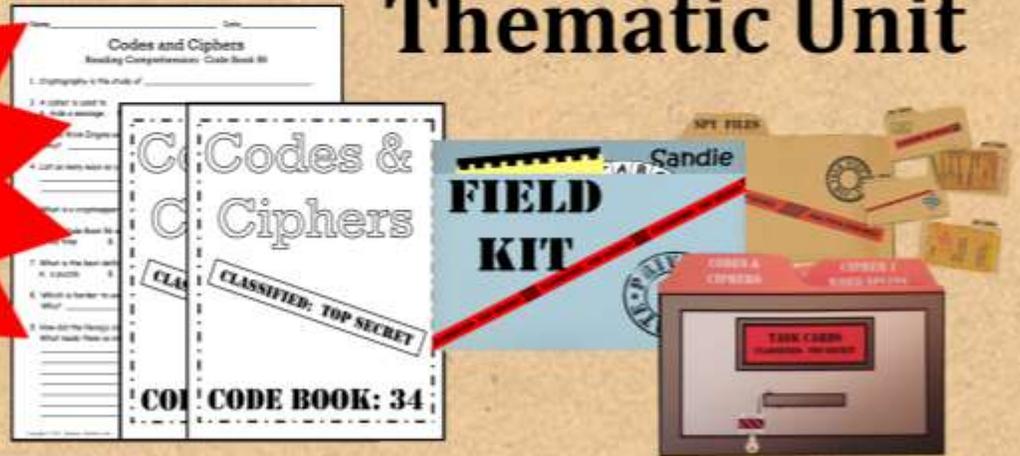


Codes & Ciphers

Thematic Unit

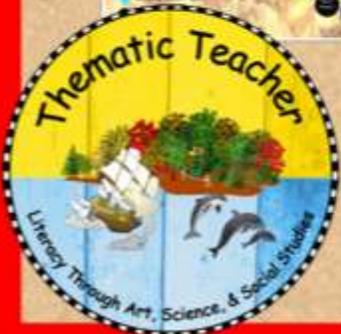
Student
Selected
Subject



Thank you for taking the time to check out this thematic unit for an exciting exploration of the mystery of secret writing. It's a LOT of fun, and gives kids plenty of problem solving practice, too!

Sandie Flynn

Grades 3-4 & Grades 5-6
Includes detailed Substitute Plans



Codes & Ciphers

Overview of Unit Materials

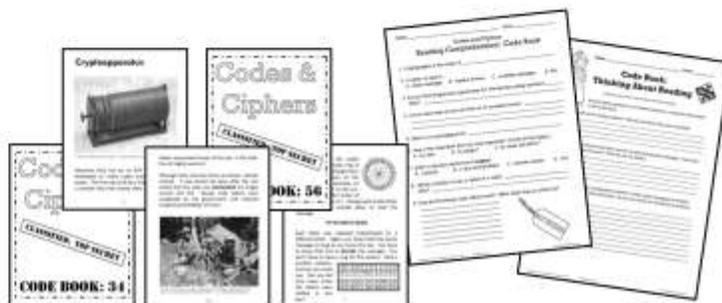
"If you could study anything you wanted to, what topics would you choose?" That's the question I asked my third and fourth graders. After thinking and talking about it for a week, they listed and discussed all the possibilities, and then voted for 10 subjects. Cryptography was one of their top choices. If you're looking for something for the first couple of days of school, an exciting subject for use when you need a substitute, or just a fun day or two to practice useful skills, this may be the unit for you! Here's what you'll find in these materials:



File 1: Teacher's Guide
Overview, Standards, Book List, Credits, and detailed Lesson Plans you can leave for a substitute. This is an exciting, student-selected topic for a special day or two.



File 2: Field Kit
Read and Follow Directions to make a "Spy Field Kit" where students will store items they create.



File 3: Student Readers and Comprehension Practice
Code Book 34: Grades 3-4
Code Book 56: Grades 5-6
Students read about Codes and Ciphers in a mini booklet of 14 pages (2 letter sized pages, double-sided, cut in half, stapled).

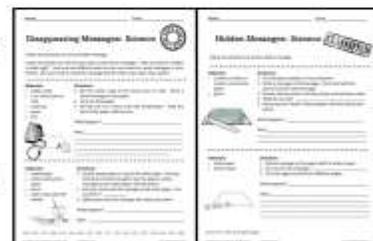


File 4: Vocabulary Activities
Word Search, Crossword Puzzle, Meaning Match



File 5: Math
Students read and answer questions about fictional Sam Sleuth, a spy traveling across Europe to deliver an important message to his handler.

File 5: Science Activities
Four science activities allow students to explore the properties of "hidden writing." Unusual supplies needed include lemon juice or milk, waxed paper, and an iron. You'll also need white crayons.



File 5 and 6: Other Worksheets
Other worksheets give students the opportunity to learn about ciphers and codes, and to practice deciphering and enciphering them. Answers are included.



File 7: Art Project
Students read, write, discuss, and draw to produce "spy notes" embedded in a drawing or painting.

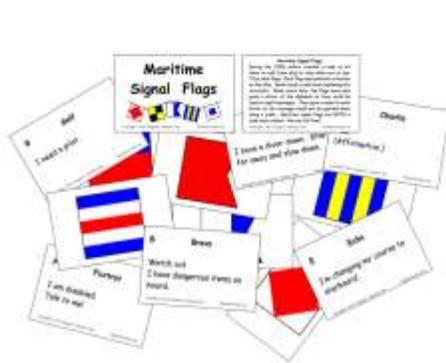


File 8: Spy File Prizes
Prizes featuring classroom privileges such as free time, reduced homework or class work.

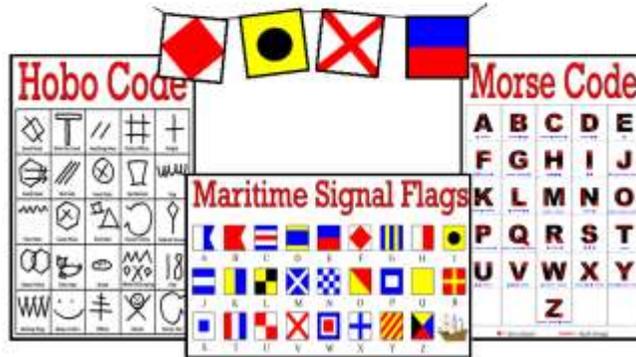
Codes & Ciphers

Spy Center Materials

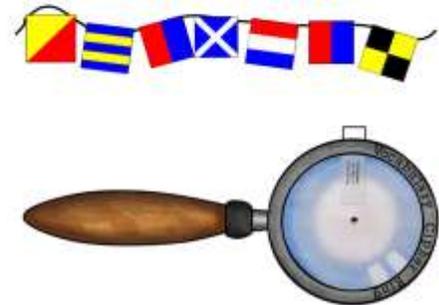
You can expand this unit by setting up a Spy Center in your classroom. This allows students to continue to explore this interesting subject long after the thematic unit has ended. You may also use these materials as assignments. Here are the available materials:



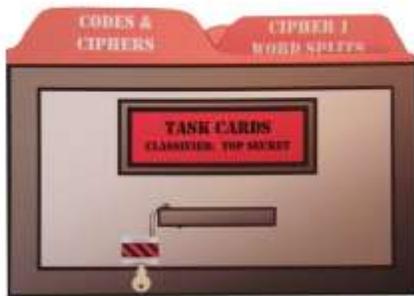
File 13: Maritime Signal Flags
Students use these cards to learn about maritime ciphers and codes using flags.



File 9: Posters and Lettering for the Spy Center
Posters (about 11X17) decorate your wall, and give students information to which they can quickly refer. Sets of signal flags send messages students can decipher.



File 11: Vocabulary Cipher Ring
Eight of the unit's important words are included in this Vocabulary Cipher Ring. Turn the glass and view a new definition. It's a unique approach to an old topic.



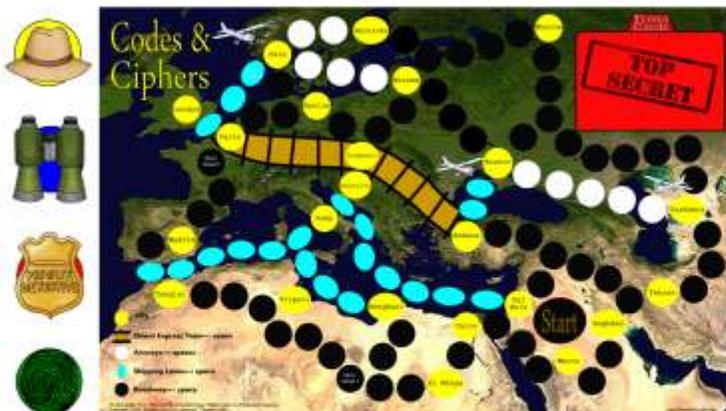
File 15: Task Cards
Students learn additional ciphers and follow directions to write their own secret messages. 15 Task Cards and Holder are included.



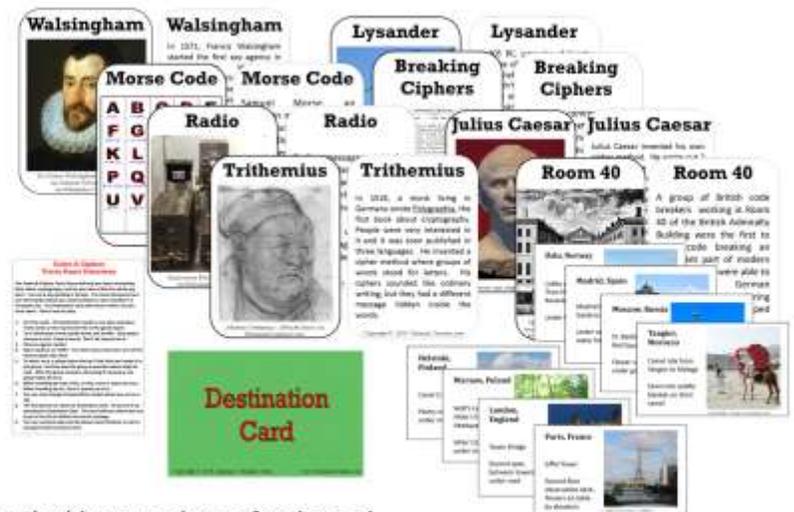
File 14: Disk Cipher Directions
Build a model of a disk cipher for student use.



File 10: Reading File Cards
Additional reading assignments are available on 12 reading cards. They contain interesting information about the history and use of secret writing.



File 12: Codes & Ciphers Trivia Game
Thirty-two trivia cards give students interesting information about the history and use of codes and ciphers. They read a card to move on a game board as they attempt to be the first to drop off a secret file at a European destination.



Substitute Lesson Plans

Codes & Ciphers

Thematic Unit

Student
Selected
Subject



FIELD KIT

CODE BOOK: 34



Code Book 34



Code Book 56



Spy Art



Grades 3-4 & Grades 5-6
Includes detailed Substitute Plans

Codes & Ciphers Summary



Codes & Ciphers is an integrated language arts/science unit focused on the origins and science of cryptography, the study of secret writing. Students will learn about the use of hidden messages historically and in the present, and will be introduced to some of the people who have contributed to the field. They will experience a variety of ways of encoding and decoding, and will write their own messages to classroom friends.

Reading activities center on nonfiction articles, learning through reading, and following "how-to" directions. A four-page student "codebook" is included which provides information about the history and use of cryptography. It comes in two different reading levels, identified by the issue number: Code Book 34 is appropriate for students in grades 3-4 while Code Book 56 is appropriate for grades 5-6. You may want to print some of each if you have a wide range of reading abilities in your classroom. Both versions present the same material and look similar, so they can be used together within any group of students. These Code Books are not consumable and may be reused.

Vocabulary is studied and practiced as students list new words on the white board. At the end of the unit they will complete a worksheet. A word search and crossword puzzle are included. A "decoder dictionary" may be placed at the Spy Center for student reference.

Writing activities focus on constructing a "spy scenario" and encoding and decoding cryptic messages to others.

A math worksheet presents students with a short story of a spy traveling through Europe to deliver a message at a dead drop location. They answer questions as they read the story. Since codes and ciphers are built on mathematical principles, math thinking and problem solving are embedded in the unit.

Students will learn the difference between a code and a cipher, they will experience several methods of encryption, and they will create their own code or cipher with a partner. During the unit they will make tools and take notes of important useful information which they will store in a "field kit."

The art project presents Lord Robert Baden-Powell, a British spy who embedded the information he collected in drawings and paintings. Students will read about him and complete a project based on his methods.

Materials for a classroom center are also included.

There is a lot to do. The unit can take 1-5 days, depending on how much you choose to do. Following, you will find complete directions for a substitute if you choose to use the unit as a substitute lesson plan.

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Codes & Ciphers

Substitute Plan: This plan provides a comprehensive overview of the unit's content, including a list of activities and materials. It is designed to be used by a substitute teacher to ensure that the unit is completed as intended.

Activities: The plan lists various activities such as reading nonfiction articles, working with codebooks, and creating spy art. Each activity is described in detail, including the materials needed and the steps to follow.

Materials: A list of materials is provided, including codebooks, worksheets, and art supplies. The plan also includes a checklist to ensure that all materials are available before the substitute teacher begins.

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 Carlson, Andy. *Alfred Wegener and His Discoveries*. Web. August 1, 2011. <http://www.gutenberg.org/files/58246/58246-h/58246-h.htm>

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Sherman, Bruce. *Secret Messages: The Basics of Codes and Ciphers*. David and Charles Publishers. Newton, MA, Dover, England, 1975, 1989.

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Navajo American Code Talkers. C-Files Web. November 21, 2007. <http://www.navajocodetalkers.com>

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Codes & Ciphers

CLASSIFIED: TOP SECRET

Cryptography

People have been using secret ways of sending information since the very earliest days of history. Ancient Egyptians developed at least six different secret coding systems. Jews, Greeks, and Romans were all familiar with the benefits of codes, but the Italians may have contributed the most to the development of cryptography (long TOG-nuh fee), the study of secret writing. Their methods were passed on to other European countries, and by the middle of the nineteenth century, codes and ciphers had become an important part of military and governmental communication.

Ciphers
 A cipher is a system that scrambles letters to make a message secret. For example, in the sentence written at the start of this booklet the letters have been rearranged. Can you tell how?

Cryptoapparatus



Machines (rip too ap uh RAT us) have been developed to make codes and ciphers much easier. The first was built by a Frenchman. It was a cylinder that had twenty disks of letters on it,

of Texas. His landing craft was blown up and he literally had to swim to the beach to survive. Also, as Seaman, he also landed on Iwo Jima where he got shot up real badly, survived one year in naval hospital.

Thomas Bepko, also one of the Code Talkers who were on Iwo Jima, a tough battle, where Three Marine Division landed on Iwo, 5th Marine Division-He was part of the Code Talkers within the 5th Marine Division.



Awards Ceremony at the White House
 On November 27, 2007, President Trump invited members of the group of heroes to the White House in order to recognize and honor their service. These members of the group were there. Here's what was said about them:

"My name is Peter MacDonald. I'm the president of the 13 surviving Navajo Code Talkers. I went in-I'm 80 years old-I went in when I was 15 years old in 1945. I was with the 1st Marine Brigade at Guam, and then went on to North China with 6th Marine Division to get those Japanese in Northern China to surrender. They didn't want to surrender, but I took 1st Marine Division, 6th Marine Division to get them to surrender eventually. We had a separate treaty ceremony in Tungsho, China, October 29th, 1945.

Flaming Nagayo is 87 years old, the oldest veteran of World War II. He survived the Battle



be broken. They were very strong. As early as 1932, even before World War II began, the Polish Cipher Bureau had already broken Enigma's code. All during the war, Germany's coded messages

Codes & Ciphers

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The entire sentence has been written in reverse order. Rewrite the letters moving from right to left and you can easily read the message. The original letters are not changed, but they are scrambled to make them hard to read. There are many ways to scramble the letters, but you will not be able to read a cipher unless you have the key. The key here is to read from right to left. This method of rearranging the letters is called a **transposition cipher**.

Trans a move
 Position a place

Another type of cipher is the substitution cipher.

The letters from the coded message on the inside ring of letters, and then change them to the letter shown on the outside ring. For example, on the inside ring T is on the outside ring, so the first letter of the secret message is Y. Change each inside letter to the matching outside letter to read the message.

TP XVI MZVY OQDN

Each letter was replaced (substituted) by a different letter. Again, you could read the secret message as long as you know the key. You have to know that V=A to decode the message. You don't have to have a ring for this system. Here's another substitution key you could use. Can you tell how many times the letters were shifted in this key?

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | W | E | R | T | A | S | D | L | K | J | H | G | F | I | M | N | O | P | R | S | T | V | X | Z | |
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |

a keyboard to type the plaintext of the message. A computer encodes the message (turns it into a code) and sends it electronically to the receiver. When it is received, the computer decodes the message back into plaintext so the receiver can read it.

Today, codes are used on the Internet to keep websites, email servers, and private information hidden and secret. The equipment will continue to improve but there will always be some mystery in codes and ciphers!



talkers were great heroes of the war, in the tradition of nighty warriors!

Although they returned home as heroes, nobody noticed. It was almost 80 years after the war ended that the code was declassified (no longer secret) and the Navajo code talkers were recognized by the government, and received Congressional Medals of Honor.



Navajo Code Talkers. Image Department of Defense, Department of the Army. U.S. Marine Corps. 1951-1952. U.S. Marine Corps.

Enigma

As enigma (uh NIG-nuh) is a very puzzling problem that no one can figure out. At the end of World War I, a German engineer invented an electro-mechanical rotary device to encode and decode messages. He named it Enigma.

electro = run on electricity
 mechanical = runs by gears
 rotary = uses wheels

Take a couple minutes to think about what a machine like that might look like. Then, on another piece of paper, draw a picture of a machine that combines these three ideas.

Other countries in Europe purchased these machines for use in their governments, but when the German military decided to use it, they stopped selling it. The Germans thought the machine's encryption (coding system) could not

Codes & Ciphers

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CODE BOOK: 56

Student Readers: Mini Books
 Two Reading Levels: Grades 3/4, & Grades 5/6
 4 pages (2 pieces of letter sized paper, 2 sided, cut in half to form mini booklet)

References

Carlson, Andy. About Enigma and Its Decryption. Web: August 1, 2011. http://homepages.tesco.net/~andycarlson/enigma/about_enigma.html

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Johnson, Bud. Break the Code: Cryptography for Beginners. Dover Publications: Mineola, New York; 1997.

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Native American Code Talkers. C-Span, Web: November 25, 2017. <https://www.c-span.org/video/?437799-1/president-trump-honors-native-american-code-talkers>

ANSWERS:

Page 1: Can you read this

Page 3: You can read this

Page 3: The shift number is 9.

Page 4: Meet me [at the] drug store.

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Americans who live in Arizona and New Mexico) developed the most clever and successful coding system in the history of the world! Using the Navajo language, which very few outsiders could understand, they combined words with images to create a "secret" language. Many of the items used in the war had no name in Navajo, so the code talkers gave them names. For example they used the Navajo word for turtle to refer to a tank. A dive bomber was called a "chicken hawk." They also used Navajo words to stand for letters of the alphabet so they could spell words out. These code talkers could send a message over the radio in 30 seconds, which would take a coding machine 30 minutes to send. And NOBODY could decode what they were saying! Enemies tried all kinds of methods, including trying to trick the talkers, but no one was ever able to break this code.

The Navajos were a Marine group who worked in the battles of the South Pacific. They were involved in some of the deadliest battles of the war, like Iwo Jima and Guadalcanal. These code

Codes & Ciphers

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CODE BOOK: 56

Codes

A code is a different type of secret writing. It requires a codebook to enable you to read the true meaning. In a code, a word or phrase are replaced by symbols, numbers, or words. Each word needs its own replacement.

3548 9834 2145 6231

If you looked the words up in the code book you might find:

2145=DRUG 3548=MEET
6231=STORE 9834=ME

Now can you figure out what the phrase above says?

This is a very complex system because you have to have a special symbol for every word you would ever want to use! That means you have to carry around a really big code book!

Cipher Rings



Codes & Ciphers

SIMPLE CIPHER RING



A cipher ring is a simple and interesting way to introduce students to codes and ciphers. A common childhood toy, this little tool will get your kiddos writing whether they know it or not! It allows students to encrypt or decode messages which they can sent back and forth to each other. You can use it as a whole-class project, or place the materials on a table for individual exploration.

You can teach your students how to use them, or see if they can figure it out on their own. You can get your class enthused and ready to learn more about the history and uses of codes and ciphers.

Objective: Students will read and follow directions to make a cipher ring, which they will use to send messages to and from their classmates, and decode information included on worksheets.

Preparation:

1. Print as many copies of page 2 as you need for your purpose, on card stock (they will last for several days per student.)
2. Place at a center and let students explore during their free time, OR use as a class or small group activity.

Uses:

- Introduce the unit using this activity.
- Free time exploration.
- Students write to their chosen friends.
- Students within a small group communicate with each other.
- Class room features a secret message for each day and students earn points or notice for decoding it.
- Prepare a bulletin board (or use the white board) so that students can post messages for the day.
- Supply the cipher ring and see if students can figure out how it works on their own.

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Codes & Ciphers

SIMPLE CIPHER RING



A cipher is a way of writing a secret message. It is made up of two parts—the system used to encode (write) the message, and the key used to decode (read) it. Even if the “enemy” knows the system you are using, they cannot decode your message unless they have the key—OR if they can figure out your key. You can make a simple cipher ring which will allow you to read and write secret messages to your friends. Here’s what to do:

You will need:

- scissors
- sharp pencil
- brass brad

Directions:

1. Cut out the two parts of your cipher ring.
2. Use the sharp tip of your pencil to push a hole in the exact center of each ring.
3. Push a brass brad through the hole and attach the two rings so that the smaller ring is on top of the larger ring.
4. Now see if you can figure out how to use the ring to read and write secret messages. You can also use the ring to see if you can read this: *W H M K*

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Codes & Ciphers

SYMBOL CIPHER RING



Letters are not the only way to encode a message. You can use pictures (symbols) as well. You can substitute a simple picture for a letter, such as ♡ can stand for the letter A, or any other letter on the ring. Make your own cipher ring using symbols. Keep the pictures simple so that you and your friends can easily write messages in your own picture language. Of course, each person will still need to know the KEY (ex. A= ♡) for each message you send, and you will all need to have the same pictures in the same order. Work together so your rings will match.

You will need:

- scissors
- sharp pencil
- brass brad

Directions:

1. Cut out the two parts of your cipher ring.
2. Draw a symbol on each section of the blank ring.
3. Use the sharp tip of your pencil to push a hole in the exact center of each ring.
4. Push a brass brad through the hole and attach the two rings so that the smaller ring is on top of the larger ring.
5. Now get together with your friends, decide on the KEY and get ready to send some pretty encrypted messages!

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Students read and follow directions to make two types of cipher rings, which they will use during the unit.



Name _____ Date _____



Codes & Ciphers: Math Sam Sleuth

MEP LIP PUBLISHERS

Read the story and answer the questions.

One day Sam Sleuth received his contact in Rome. He decoded the message, then he went to the contact's house to deliver it personally, soon to do. The key to the code was a park in Paris—he had to

Because he didn't want to be followed, Sam decided to leave Rome by car and plane.

1. How many miles did Sam travel by train? _____ miles
2. Traveling at 50 miles per hour, how long would it take Sam to reach _____
3. How far did Sam travel by plane? _____ miles

Once he arrived in Paris, Sam headed to the park. He had been given directions to help him locate the key. The directions read, "North 20 paces to the old oak tree. West 125 paces to the pretzel stand. North 65 paces to the lake front. Walk east along the lake front 56 paces. You will see a trashcan chained to a rail. There is a false bottom in the trashcan. Reach underneath to find the key."

4. Draw a map of these directions. Label the park entrance and all the directions. Color it in.



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Ye Olde Hot Dog Stand

| MENU ITEM | add 3% tax |
|----------------|------------|
| Hamburgers | \$ 9.95 |
| Chili Burgers | \$ 10.95 |
| Chili Burgers | \$ 10.95 |
| Hot dogs | \$ 1.50 |
| Chili dogs | \$ 1.75 |
| Sanwiches | \$ 4.75 |
| Sandwiches | \$ 9.95 |
| Shrimp & Pie | \$ 10.95 |
| Fish and Chips | \$ 8.95 |
| Soft Drinks | \$ 2.50 |
| Tea | \$ 3.50 |

B. All went as planned, and precisely at 2:25 PM a lovely young English girl strolled up to Sam and said, "Lovely day for a hot dog, isn't it?" Sam replied, "I'd be delighted!" He and his "friend" strolled over to the hot dog stand. Sam ordered two hot dogs, one hamburger, a soft drink, and a tea. How much did the meal cost him?

As he passed the food to her, Sam gave the girl the message wrapped in the paper lining of the hot dog. He knew she needed a key, so as he talked he held up a finger to show her that each number stood for a letter. She understood. Key: 1=

9. Sam hurried to an old hotel room. He was exhausted—he had been working since 7:34 AM Saturday morning. It was now 8:45 PM Monday afternoon. How long had he spent on this case? _____
10. When the English girl got back to her room, she opened the important message. Decode the message she found:
16-18-05-19-09-04-05-14-20 23-09-12-12 01-18-18-09-22-05
02-25 16-12-01-14-05 01-20 06-09-22-05 16-13 15-14
20-21-05-19-04-01-25

| CIPHER KEY | | |
|------------|------|------|
| A-01 | K-11 | U-21 |
| B-02 | L-12 | V-22 |
| C-03 | M-13 | W-23 |
| D-04 | N-14 | X-24 |
| E-05 | O-15 | Y-25 |
| F-06 | P-16 | Z-26 |
| G-07 | Q-17 | |
| H-08 | R-18 | |
| I-09 | S-19 | |
| J-10 | T-20 | |

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Name _____ Date _____

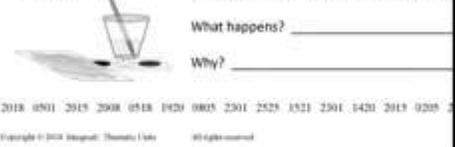
Disappearing Messages: Science

Follow the directions to send a hidden message. Codes and ciphers are not the only way to send secret messages. They can be hidden in plain sight. Here are two different ways you can use science to send secret messages to your friends. One uses heat to reveal the message and the other uses water to reveal the message.

- Materials:**
- cotton swab
 - 1 oz. lemon juice or milk
 - small cup
 - paper
 - iron
- Directions:**
1. Dip the cotton swab in the lemon juice or milk and write a secret message on the paper.
 2. Let it dry thoroughly.
 3. Set the iron on a warm (not hot) temperature. Rub the back of the paper with the iron.



- Materials:**
- waxed paper
 - white construction paper
 - pencil
 - water color paint OR marker
- Directions:**
1. Lay the waxed paper on top of the white construction paper. Write a message on the waxed paper with the pencil.
 2. Lightly rub your hand over the message on the waxed paper. Can you feel it? _____
 3. Lightly paint over the message with water color paint or marker.



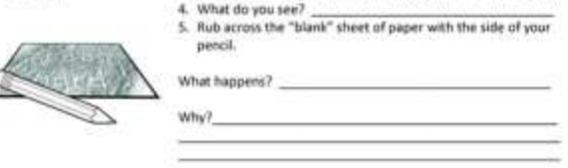
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Name _____ Date _____

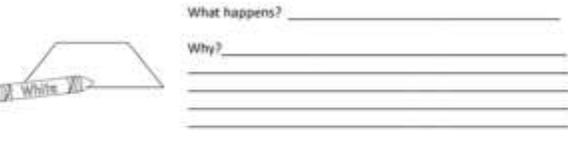
Hidden Messages: Science **CLASSIFIED**

Follow the directions to send a hidden message.

- Materials:**
- 2 pieces of white or manila construction paper
 - pencil
- Directions:**
1. Put one piece of paper on top of another.
 2. Write a message on the top page. Press really hard with the pencil, but don't tear the page.
 3. Remove the top sheet, and look closely at the bottom sheet.
 4. What do you see? _____
 5. Rub across the "blank" sheet of paper with the side of your pencil.



- Materials:**
- paper
 - white crayon
- Directions:**
1. Write a message on the paper with the white crayon.
 2. Can you see the message? _____
 3. Turn the page and look from different angles.



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Math and Science

Spy Files Rewards



There are several hidden messages contained in these materials. When students locate and decrypt one, they may take a "file" from the "Spy Files". Rewards include free time and class work reduction.
Print on manila construction paper.

Beale's Cipher

Beale's Cipher is a form of simple substitution cipher. It was invented by Thomas Jefferson in 1805. The cipher is based on the letters of the alphabet, which are arranged in a grid. Each letter is represented by a unique symbol or code. The symbols are arranged in a grid, and the letters are read off in a specific order to reveal the message.

Beale's Cipher

I have deposited in the custody of Robert, and four other men, a certain number of papers, and in each paper the names of the persons who were present at the meeting, and the names of the persons who were present at the meeting, and the names of the persons who were present at the meeting.

Hobo Code

| | | | | |
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Maritime Signal Flags

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| A | B | C | D | E | F | G | H | I |
| | | | | | | | | |
| J | K | L | M | N | O | P | Q | R |
| | | | | | | | | |
| S | T | U | V | W | X | Y | Z | |

Spy Central



Morse Code

| | | | | |
|---|---|---|---|---|
| A | B | C | D | E |
| F | G | H | I | J |
| K | L | M | N | O |
| P | Q | R | S | T |
| U | V | W | X | Y |
| | | | Z | |

Spy Central

Add a Spy Center to your classroom for student exploration. Students can learn a lot about cryptography by doing some research on their own.

**SIR JOHN
TREVANION**

NATHAN HALE

**EMMA
EDMONDS**

ROOM 40

**JEFFERSONS'S
DISK CIPHER**

**CULPER
SPY RING**

**A CODE FOR THE
UNITED STATES**

CODE SPEAK

**KNOT
A CODE**

**THE CAESAR
CIPHER**

**BREAKING
A CIPHER**

**THE BEALE
CIPHER**

One of the first recorded uses of ciphers was made by the Roman Emperor Julius Caesar. Although ciphers were probably used long before his time, he created a simple cipher to make sure that messages sent throughout his vast empire could not be read by his enemies. Of course, most people of that time couldn't read anyway, so maybe his efforts weren't all that necessary.

The Caesar Cipher is also called a shift cipher because he simply moved the letters of the alphabet three spaces to the right. For example, if he wanted to send the message "wait there," he would write

WAIT THERE
TXFQ QEBOB

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
X Y Z A B C D E F G H I J K L M N O P Q R S T U V W

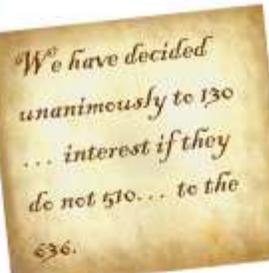
You can use strings of alphabet letters like you see above to make a huge number of ciphers. You can make shift ciphers that move to the right (clockwise) or to the left (counterclockwise). Moving clockwise is called a + shift. Caesar's Cipher is a +3 shift cipher because he moved three alphabet spaces ahead. Moving counterclockwise is - shift. Using a cipher ring you can make any number of shift ciphers and you only have to tell your reader if it is a + or a -, and how many moves you made.

Coded messages were used by both sides throughout the Revolutionary War between the Colonies and Great Britain). When the war ended, a new country was born—the United States of America. It needed a code so that it could safely send secret messages around the world.

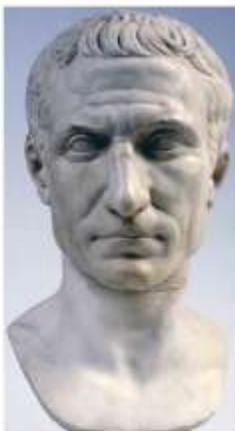
Robert Livingston was the Secretary of State. He was in charge of all the diplomats that represent the United States in other countries. He created a code for the new nation. First, he made a list of all the words, syllables and letters that he might need to use. Then, he made a form where he listed all numbers from 1-1,700. Next to each number he wrote the words, syllables, and letters from his list in alphabetical order. Finally, he gave each diplomat a copy of the code.

To keep the code safe, Livingston changed it at random times. Sometimes it was good for a few days. Other times it worked for a week, or a month. He changed others to figure out. Every person using the code had to know what the changes were. Since the code was quick and easy to change.

Livingston's code was used for about eight years. Jefferson was working in France. He changed the code. He sent a member of the House of Representatives to France to tell Madison was that Madison was on a vacation and had



Robert B. Livingston Biography: The Biography.com website. All rights reserved. <http://www.biography.com/people/robert-b-livingston-11277>
American, Paul F. Top Secret: A Handbook of Codes, Ciphers, and Secret Writing. Confidential Press. www.confidentialpress.com
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Portrait of Caesar Julius Caesar (Vatican Museums: Musei Vaticani, Sala Terrena del Vaticano), via Commons.com



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"I am naturally fond of adventure, a little ambitious, and a good deal romantic—but patriotism was the true secret of my success." —Emma Edmonds

Historians think that at least 400 women served in the Civil War as soldiers, but very few of them left any evidence of their service. Emma Edmonds (Sarah Emma Evelyn Edmonds) wrote a book telling of her adventures as a woman, posing as a man, with the Flint Union Grays. Her story is full of danger, intrigue, and just plain craziness.

Emma was born in New Brunswick, Canada in December of 1841. Her father was a farmer and he was very disappointed that the son he was hoping for turned out to be a daughter. He never accepted Emma, so at the age of 16 she packed up her belongings and moved to Flint, Michigan. There Emma went door-to-door selling Bibles, and worked as a medical orderly.

In April of 1861, Abraham Lincoln called for 75,000 volunteers to join the Union army. The War Between the States had begun. Emma cut her hair, dressed like a man, and joined the long line of men signing up for Company F, the Flint Union Grays of the US Army. When she signed the enlistment papers the name she used was Franklin Thompson. She was now "Frank", a field nurse with the army. No one knew she was a woman. Could she keep her secret as she lived and served among hundreds of men?

One day, when working in the field hospital, Emma (Frank) heard about the death of a very valuable spy who had been caught by the Rebels. After a little thought, she decided to volunteer as his replacement. She (he) got the job.

Emma used lots of different disguises as she worked behind enemy lines. "Cuff" was a young black man who worked with the slaves in the Rebel's camp. "Bridget O'Shea" was a plump (plumped with a pillow) Irish woman, traveling through the camps to sell her wares. She once dressed as a soldier from a Rebel division. She also carried secret messages between Union camps.

Dressed as a black washerwoman, Emma found a set of very important papers on the desk of a general. She quickly stuck them in her petticoat, and left the camp. She hid until night time in an old cabin. As she snuck out in the dark, she ran into a group of Rebel soldiers. She convinced them that she belonged with them, and they gave her a horse. At the first opportunity she rode off and returned safely to her Union camp. She now had a horse she named Rebel.

Emma spent 2 years in the army, serving as a field nurse, a spy, and a soldier in battle. Then she came down with malaria and could no longer serve. During her time in the army, she had many close encounters with the enemy, risked her life every time she went out on a mission, and served her people well. No one ever knew that she was a woman until the war was over. A special act of Congress gave her an honorable discharge, an army pension, and a bonus.



Franklin Thompson (Sarah Emma Edmonds) via Wikimedia Commons.

Rob Newman. Behind Rebel Lines: The Incredible Story of Emma Edmonds. New York: Harcourt, 1990.
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12 Reading File Cards

THE CAESAR CIPHER

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WAIT THERE
TXFQ QEBOB

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
X Y Z A B C D E F G H I J K L M N O P Q R S T U V W

You can use strings of alphabet letters like you see above to make a huge number of ciphers. You can make shift ciphers that move to the right (clockwise) or to the left (counterclockwise). Moving clockwise is called a + shift. Caesar's Cipher is a +3 shift cipher because he moved three alphabet spaces ahead. Moving counterclockwise is a - shift. Using a cipher ring you can make any number of shift ciphers and you only have to tell your reader if it is a + or a -, and how many moves you made.

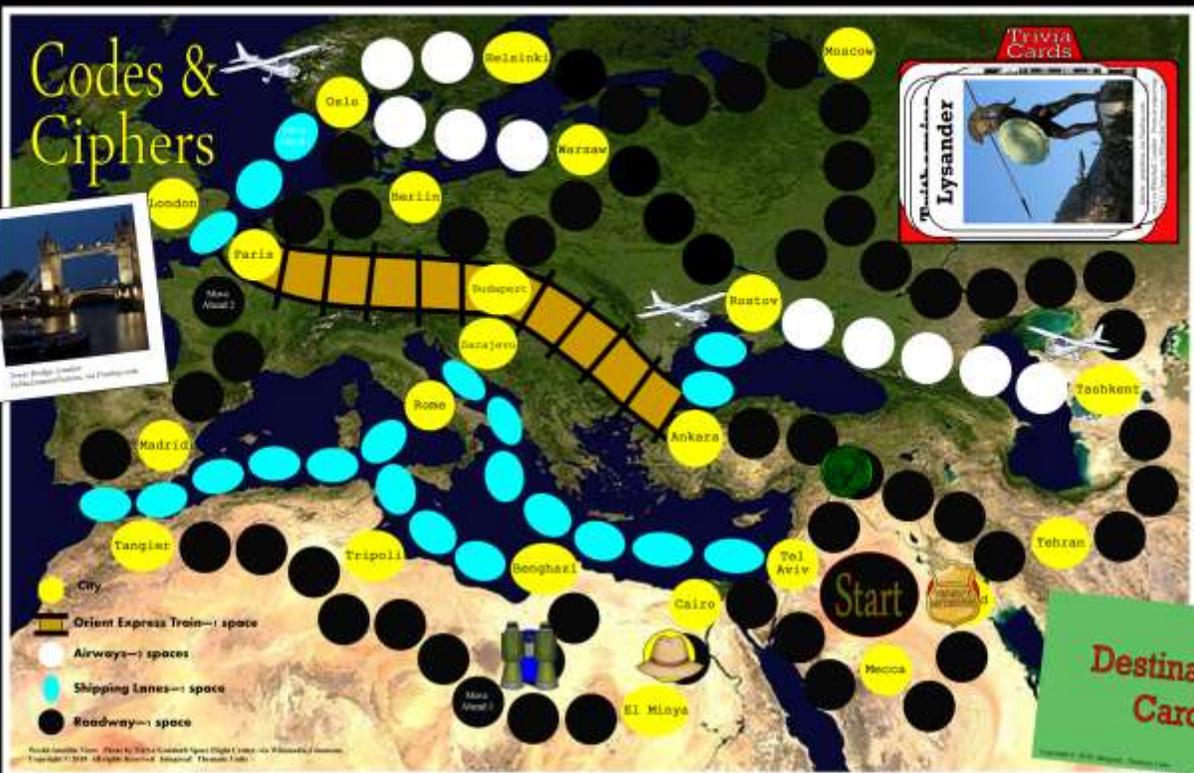


Can you tell what shift cipher this ring is set to?

ELT BXPV FP QEXQ



Portrait of Gaius Julius Caesar (Vatican Museum): Musei Vaticani (Stato Città del Vaticano), via WikimediaCommons.com.



London, England

Tower Bridge

Second span, between towers, under road

- City
- Orient Express Train → space
- Airways → spaces
- Shipping Lanes → space
- Roadway → space



Walsingham

In 1571, Francis Walsingham started the first spy agency in England.

Morse Code

Samuel Morse

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Radio

Julius Caesar

Julius Caesar invented his own cipher method where groups of words stood for letters. His ciphers sounded like ordinary writing, but they had a different message hidden inside the words.

Room 40

A group of British code breakers working in Room 40 of the British Admiralty Building were the first to make code breaking an important part of modern warfare. They were able to read most German messages sent during World War I, which helped the allies win.

Oslo, Norway

Madrid, Spain

Moscow, Russia

Tangier, Morocco

Warsaw, Poland

London, England

Paris, France

Trithemius

Codes & Ciphers Trivia Game Directions

1. Start the cards. Put Destination Cards in one pile, and place the other cards in the Top Secret pile on the game board.
2. Take Destination Cards from one end and shuffle. Each player will have a card.
3. Make a guess.
4. Make a guess on the card. Four that were used to be one of the other cards.
5. When a player has a question about what the card is, they can ask the group. If necessary, the group can help.
6. When a player has a question about what the card is, they can ask the group. If necessary, the group can help.
7. When a player has a question about what the card is, they can ask the group. If necessary, the group can help.

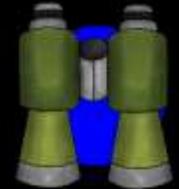
Trithemius

In 1518, a monk living in Germany wrote *Polygraphia*, the first book about cryptography. People were very interested in it and it was soon published in three languages. He invented a cipher method where groups of words stood for letters. His ciphers sounded like ordinary writing, but they had a different message hidden inside the words.

Room 40

Room 40

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Trivia Game

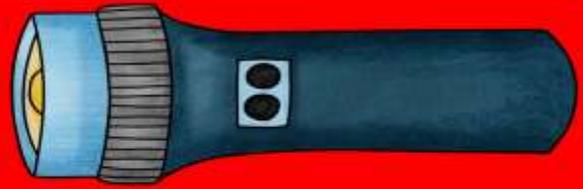
Students read and ask questions about interesting information contained on 32 trivia cards as they move across a map of Europe to a secret destination where they deliver a Classified file.



15 Task Cards with Holder

CIPHER 14 POE'S CIPHER

Edgar Allan Poe was an American author who wrote mysteries and spooky books in the 1800s. Sometimes he used ciphers as an important part of his story telling. He made up this cipher for an article he wrote called "A Few Words on Secret Writing." Here's the alphabet. Notice that U and V have the same symbol.



Materials: pencil, paper

Directions:

1. Write the plaintext of your message.
2. On another piece of paper encipher it using Poe's alphabet.
3. Send it off to a friend. (Make sure he or she has the key!)
4. If you like this alphabet, make a copy of it for your Field Kit. You could change some of the symbols.

Can you decipher this?

_t0.[t0i
#) [i

| | | |
|-----|-----|------|
| A) | J ? | S] |
| B (| K ! | T [|
| C - | L & | U £ |
| D * | M O | V £ |
| E . | N ' | W \$ |
| F , | O † | X ¢ |
| G ; | P ‡ | Y i |
| H : | Q ¶ | Z ↵ |
| I ? | R ↵ | |

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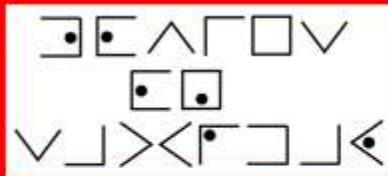
CIPHER 15 PIG PEN CIPHER

The Pig Pen Cipher is another cipher where letters are replaced by symbols. It works in the same way as the Rosicrucian Cipher.

Here's the key:

| | | |
|---|---|---|
| A | B | C |
| D | E | F |
| G | H | I |
| J | K | L |
| M | N | O |
| P | Q | R |
| S | T | U |
| V | W | X |
| Y | Z | |

See if you can decipher this:



CONFIDENTIAL

Materials: Tic-Tac-Toe grid, pencil, paper

Directions:

1. Make a copy of the Pig Pen Cipher key and put it in your Field Kit.
2. Write a plaintext message.
3. Encipher it using the Pig Pen Cipher on another piece of paper.
4. Send it to a friend or post it on the bulletin board for your classmates to decipher.



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Units

References

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Janeczko, Paul B. Top Secret: A Handbook of Codes, Ciphers, and Secret Writing. Candlewick Press: Somerville, Massachusetts, 2004.

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Credits