

Introduction

Over 10,000 women were recruited to serve as codebreakers during World War II. Secretly plucked from prestigious colleges like Wellesley, Smith, Barnard, and Radcliffe, these women were trained during the war to become codebreakers for the US Army and Navy. At first not inducted into the military, these women served in a civilian capacity based at two codebreaking centers in the Washington, D.C., area. They were instrumental in cracking codes that provided critical intelligence information in both the European and Pacific theaters. Sworn to secrecy, the story of these women was not told for 50 years. In this lesson, students will read primary and secondary sources, answer questions, and decipher codes to learn more about these heroic women.

Objectives

By analyzing a series of primary and secondary sources, students will be able to:

- Describe the roles and contributions of women codebreakers during World War II
- Cite details and evidence from a variety of sources to explain the experiences and history of women codebreakers

Grade level

6-12

Time Requirement

One 45- to 50-minute class period with extension options

Materials

- Copies of the History of Women Codebreakers Student Handout
- Copies of Deciphering the Code Student Handout
- Copies of Student Activity Answer Key
- Timer (optional)

Online resources

ww2classroom.org

Code Girls Video

STANDARDS

Common Core Standards

CCSS.ELA-LITERACY.RH 6-8.1

Cite specific textual evidence to support analysis of primary and secondary sources.

CCSS. ELA-LITERACY. RH 6-8.2

Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.

CCSS.ELA-LITERACY.RH.9-10.2

Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.SL.9-10.1

Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.L.9-10.6

Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

CCSS, ELA-LITERACY, RH 11-12.2

Determine the central ideas of information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.

CCSS.ELA-LITERACY.SL.11-12.1

Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.L.11 - 12.6

Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.



8th Grade Social Studies (LOUISIANA)

8.14 Describe the causes, course, and consequences of World War II. J. Explain the sacrifices and contributions of US soldiers during World War II such as the Tuskegee Airmen, the 442nd Regimental Combat team, the 101st Airborne, Cajun "Frenchies," the Women's Army Corps (WAC), and the Navajo Code Talkers. N. Describe the importance of the Manhattan Project and development of atomic bombs, and analyze the decision to use them.

High School US History (LOUISIANA)

US.15 Explain the causes, course, and consequences of World War II. D. Describe the sacrifices and contributions of American service members in the war effort including the Tuskegee Airmen, Military Intelligence Service, 442nd Regimental Combat Team, the 101st Airborne, Women's Army Corps (WAC), Navajo Code Talkers, and the Army Signal Corps. G. Explain the role of military intelligence, technology, and strategy during World War II including cryptology, the Manhattan Project, island hopping and describe major battles of Midway, Normandy, Iwo Jima, Okinawa, and the Battle of the Bulge.

PROCEDURES

- Before facilitating this lesson, teachers can show the Code Girls Video found online at ww2classroom.org. This
 video will give students needed background on the experiences and history of women codebreakers during
 World War II. This video is under six minutes.
- 2. After showing the Code Girls Video, teachers can facilitate a class discussion prompting students with the following questions:
 - a. Who were the code girls? What did they do during World War II?
 - b. Why is the story of women codebreakers still unknown today?
 - c. What details and facts about women codebreakers stood out to you as you watched this video?
 - d. Note: Teachers can introduce these questions for students to take notes while watching the video to prepare to discuss with the whole class.
- 3. The teacher will share the lesson objectives, especially that today's goal is to break or decipher a code themselves and learn more about the role of women codebreakers during World War II.
- 4. The teacher will divide students into even groups. Alternatively, teachers can allow students to complete this activity independently or in partners. The teacher will distribute the History of Women Codebreakers Student Handout and direct students to read the primary and secondary sources and answer the questions following each passage.
- 5. After students have answered all questions on the History of Women Codebreakers Student Handout, the teacher will distribute the Deciphering the Code Student Handout. Instruct students to use their answers from the previous handout to decode the secret message from Nazi Germany. Students will substitute each letter in their answers using the guide on the Deciphering the Code Student Handout. Encourage students to reevaluate their answers to the questions on the first handout if they are struggling to decode the message. The final decoded message should read "Women Break Vital Codes to Win War." Teachers should use the provided answer keys to help students complete this activity.
 - Note: To make this activity a competition, set a timer and the first group or student who accurately finishes wins.

- 6. Once all students have finished breaking the code, teachers can review the correct answers with the whole class.
- 7. Exit Ticket: Following the whole-class discussion, the teacher will instruct students to write a written response (either in complete sentences or bullet points) to the two questions below. Encourage students to cite details and evidence from the lesson materials.
 - a. What were the experiences and challenges of women codebreakers during World War II?
 - b. How did women codebreakers contribute to the war effort during World War II?

DIFFERENTIATION AND EXTENSION

Differentiation

Teachers can employ an "I Do, We Do, You Do" or gradual release approach. The teacher will model answering one question on the History of Women Codebreakers Student Handout and decoding this answer with the Deciphering the Code Student Handout before asking students to complete the activity as a class and then independently.

Extensions

Provide students with a scenario from World War II and have students develop their own code system to communicate about this scenario. Teachers can pull scenarios from the War in Europe: Evaluating Historic Decisions lesson plan or the Strategic Decision-Making in the Pacific lesson plan found online at ww2classroom.org.

Assign students a research project on one of the following well-known women codebreakers: Elizabeth Friedman or Genevieve Grotjan.

ABOUT THE LESSON AUTHORS

ERIN COGGINS, Ed. S., is a high school social studies and journalism teacher in Alabama. During her 22 years in the classroom, she has participated in The National WWII Museum's summer teacher programs, the Gilder Lehrman teacher seminars, and the Albert S. Small Normandy Fellowship. She was Alabama's History Teacher of the Year in 2018 and serves as the educational coordinator for the nonprofit Honoring Veteran Legacies.

STUDENT HANDOUT

HISTORY OF WOMEN CODEBREAKERS

Instructions: You are a female codebreaker in World War II, and President Franklin D. Roosevelt is pressing for the war to end before Christmas. The US Army has received hopeful intelligence that the Germans may be on the brink of surrender. All that needs to be done is deciphering a code that will give the Army the information needed to force the surrender. Can you do it? In record time?



GETTING RECRUITED

College women were recruited by their professors or even through telegrams. They had to answer two questions.

- 1. Do you like doing crossword puzzles?
- 2. Are you planning to get married soon?

If their answers to the first question was yes and their answer to the second question was no, these women were enrolled in the required courses and sent to training.

"How the American Women Codebreakers of WWII Helped Win the War," Smithsonian Magazine (October 5, 2017), Maya Wei-Haas

Primary Source

Janice Martin Benario

"I was a senior at Goucher University in Baltimore majoring in Latin. Everyone I knew was doing something for the war. Girls were rolling bandages, going to USO parties and such. Everybody's mind was on the war and wanted to do something to help because this was a war that we had to win. In the fall of my senior year, one day, my English professor stopped me in the hall, and this was Dr. Winslow—she had just won a Pulitzer Prize for a biography she had written. She said, 'Janice, would you come to my office?' I went in, sat down. She closed the door and stood in front of the door and told me about a course the Navy is giving in cryptology—seven different colleges were offering it and Goucher was one of them. She said you can take the course and go into the Navy. She said it was very secretive and I couldn't tell anyone."

The National WWII Museum Digital Collections

Question: The mission was top _____ therefore the women could not tell their family, roommates, or boyfriends about their work.



TRAINING AND THE JOB

The women went through difficult training courses to learn about deciphering coded messages. After training, many of the women moved to Washington, D.C., to work in Arlington Hall. A former girls college, Arlington Hall was taken over by the US Army in 1942 to establish its Signal Intelligence Service (SIS). It was here that the responsibility of female codebreakers was the cryptoanalysis of intercepted enemy messages, development of codes and ciphers for the Army, and production of Army ciphering machines.

"How the American Women Codebreakers of WWII Helped Win the War," Smithsonian Magazine (October 5, 2017), Maya Wei-Haas

Primary Source

Janice Martin Benario

"We went on active duty early in July 1943. We went for indoctrination for eight weeks. Some of us went to Mount Holyoke and some to Smithboth of which had officer training classes. We studied all sorts of Navy subjects and took exams. When we passed, we were ensigns. The officer class had around 80 to 110 women from the seven colleges. Three-quarters were given communication orders in Washington, D.C. We were all cleared to handle top-secret material, so we reported to the main Navy building and there we received our individual orders. Two others from Goucher, one from Radcliffe, and I were assigned to OP 20G. Our branch was reading the German naval Enigma traffic between the German high command to U-boats and back. We were cleared to handle top-secret ULTRA material. No one else knew there was such a level. We went on active duty in the middle of

September 1943. All we knew then was that the messages came into our offices as yellow strips of papers like telegrams used to come. We had two translators on duty at all times. The messages came in strips of letters. Translators had to divide it into German words. They were handed to the senior watch officers who read them. Then it was passed to our desks. We were junior watch officers. There was a big board war map of the Atlantic Ocean, the US, and Europe. And we had pins for every submarine we knew about. Our office had collected lots of information about the German subs and people on them. I call them 'navalese' words. There were also pins with a paper flag on it for every convoy. One of our main jobs was to keep that board up to date because that board was used by those studying what was going on. We worked watches for one week 8 (a.m.) to 4 (p.m.), the next week 4 (p.m.) to midnight, and then the next week midnight to 8 (a.m.). When we were at midnight at 7:30 (a.m.) each day, we prepared an envelope of decoded messages for downtown and the research people wrote a couple of sheets in big red letters-ULTRA TOP SECRET. We took the envelope to the door in a locked pouch carrier to the driver. He couldn't come in for obvious reasons. The messages went up to the US submarine tracking room and to Admiral (Ernest J.) King. So, we were one step below the top. It was ULTRA secret all the time." The National WWII Museum Digital Collections

Question: After passing their exams and being inducted into the military, the female codebreakers reported to ______ to carry out their orders in communications.



STUDENT HANDOUT History of Women Codebreakers

SOLVING THE ENIGMA

The women codebreakers were tasked with listening for coded radio messages from other countries. Names of enemy ships and commanders could be in coded messages and therefore the women could help break it. They looked for patterns—for instance, where and when messages were sent could be clues about troop movements. These women studied long strings of letters and numbers, looking for patterns that might reveal a message hidden in sentences that looked like nonsense. Sometimes they used complex technology and equipment to help.

"The Women Codebreakers of WWII," National Geographic Online.

Primary Source

Janice Martin Benario

"The messages were sent by the Germans on the Enigma machine. Every German in contact with the high command had the Enigma machine. The navy Enigma was more complicated than all the rest. It took the Allies more time to break into it. The Germans never knew we broke into it, that's why it had to be kept secret. Admiral (Karl) Dönitz got suspicious because, how did we know to send a destroyer to the north of Africa? But his underlings always persuaded him that the Allies could not break into it. It was

secret until 1974. The U-boats had to send in a position report every day—position and weather. (They) would talk about convoys, ship sinkings, high command orders. Here we were at the top, reading all these messages. A German operator would have his message to put into the Enigma machine. There was a typewriter row of keys, and the German operator had to use, letter by letter, what we called the hunt-and-peck method. The machine worked by changeable electric currents, and that current would go through all the wheels and another row of letters one would write up, and they would write that letter down and punch the next one. Then those messages were sent by Morse code and picked up at receiving stations on the British coast and east coast of the Atlantic. Then they were turned over to the British coding people at Bletchley Park and then to us when we got in (to the war)."

The National WWII Museum Digital Collections

Question: To solve the German Enigma machine, the codebreakers had to look for ______ that might reveal a message hidden in sentences that looked like nonsense.



SOLVING THE PURPLE CODE

Codebreaker Genevieve Grotjan graduated from the University of Buffalo with a mathematics degree and was hired in 1939 as a junior cryptologist after her high score on a civil mathematics test was discovered. Her discovery in September 1940 changed the course of history.

Secondary Source

"Frank B. Rowlett: A Personal Profile" by Theodore Hannah

"Finally, Genevieve Grotjan finds the evidence we are looking for. Time is about 2 p.m. Ferner, Small, and I are at a table in the working area discussing prospects and reviewing work. Grotjan enters the room, obviously excited, politely interrupts, and asks if she can show us what she has found. She takes us to her desk in the next room, lays out worksheets, points to one example, then another, then a third. She stands back, with eyes tranced behind her rimless glasses. Al Small dashes around the room, hands clasped above his head like a victorious prizefighter. 'Whoopee!' he yells. Ferner, the quiet one, clasps his hands, shouting, 'Hooray, Hooray.' I jump up and down—That's it! That's it!' The room gets crowded; everyone in the section is suddenly in the room. Friedman comes in and asks, 'What's all the noise about?'

I settle down and say, 'Look what Miss Grotjan has just discovered.' Gene wipes her eyes, tries to regain her composure. I point to the worksheets—Gene's found what we've been looking for. Look here, and here, and here.'

Friedman examines each one and understands what he sees; he looks suddenly tired. We take a break and send out for Cokes. The excitement gradually wears off and we look ahead to the next step."

That next step would soon lead to the solution of Japan's highest level diplomatic cipher system, the so-called Type "B" machine, better known as "Purple." What young, studious Genevieve Grotjan had discovered on that warm Friday afternoon in September 1940 represented the decisive breakthrough into a highly sophisticated machine system that for 18 months had stubbornly resisted the concerted attack by some of the best cryptanalysts in the world. Its solution has been called "the greatest feat of cryptanalysis the world had yet known," one which, in the words of another author, "involved a unique intellectual effort of heroic proportions." With its solution the United States became an unlisted subscriber to the communications network serving the Japanese Foreign Ministry and its major embassies abroad, and thereby gained important insight into Japan's diplomatic and military moves. The decrypts were also a primary source of information on Hitler's intentions in Europe, as reported to Tokyo by the Japanese ambassador in Berlin, Baron Oshima.

"Frank B. Rowlett: A Personal Profile" by Theodore Hannah

Question: Genevieve Grotjan changed the course of history when she decoded Japan's highest diplomatic cipher system known as

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STUDENT HANDOUT History of Women Codebreakers

LIVING IN WARTIME WASHINGTON, D.C.

Washington, D.C., was the center of the world during World War II, filled with newcomers with the desire to do whatever it took to beat the Germans and the Japanese. Thousands of new arrivals were women. At one point, as many as 10,000 boarding houses were operating, and boarding and rooming houses were advertised as an economical way to live with wholesome friends.

"Government Girls: World War II's Army of the Potomac," by Megan Rosenfeld, The Washington Post.

Primary Source

Janice Martin Benario

"Enlisted WAVES had to live in WAVES barracks. Across the street from the communications office was a huge barracks. We were given \$21 a month to use for housing. We could live anywhere we wanted. Some of the girls would go together and rent apartments. D.C. had many boarding houses. They would serve breakfast and dinner in a two-hour period so no matter what shift you worked, you could usually get a meal. The particular one that I lived in was very near Dupont Circle in downtown D.C. My roommates were always civilians. I had one that swore she was going to get me to talk in my sleep to see what I was doing at work, but she never did. D.C. was full of service people and it was safe day or night. No fear of walking the five blocks to the bus from where I lived."

The National WWII Museum Digital Collections

Question: Thousands of women flocked to Washington, D.C., known as the _____ of the world in World War II, to contribute to the war effort.

AFRICAN AMERICAN FEMALE CODEBREAKERS

Arlington Hall had an African American codebreaking unit. Historians credit First Lady Eleanor Roosevelt, who declared that 12 to 15 percent of Arlington Hall workforce should be Black. "The African-American unit monitored the enciphered communications of companies and banks to see what was being transmitted in the global private sector and who was doing business with Hitler or Mitsubishi." As part of their duties, the unit maintained a library of 150 systems that included files of addresses and characteristics of all the world's main commercial codes. These units were segregated from the white codebreakers and overseen by African American men.

Code Girls: The Untold Story of the American Women Code Breakers of World War II by Liz Mundy



Primary Source



Image Courtesy of Center for Local History, Arlington Public Library

Question: The African American unit worked in the basement of Arlington Hall, _____ from the white female codebreakers.

STUDENT HANDOUT

DECIPHERING THE CODE

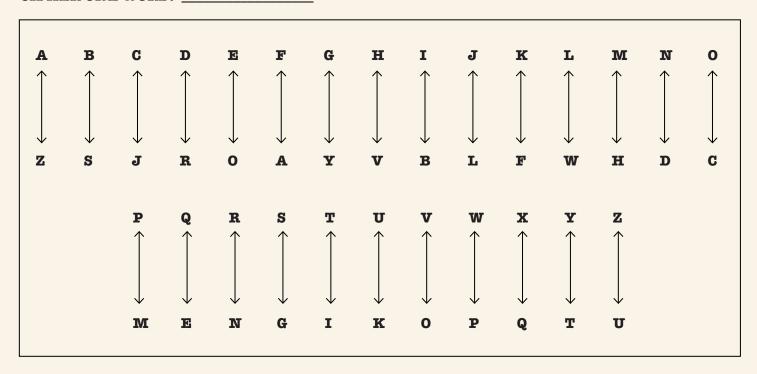
Instructions: Using the answers to the questions, you will decode the message from the high German command. Compared to the complex codes of World War II, this is easy. Decode the message in each word by substituting the coded letter in the top row that corresponds to the letter on the bottom. The answers to the questions from the Student Handout are your ciphers. NOTE: The decoded cipher will include the word needed to solve the cipher. This is where recognizing patterns (or in this case a word) comes into play.

Sample Code (Using Cipher One): LFHQB

Decoded: WAVES



CIPHER ONE WORD:



CIPHER SOLVED:

CIPHER TWO WORD:

A	B s	J C	D	E	F A	G ↑ ↓ ¥	H	I B	J L	K	L ↑ W	M	N ↑ ↓	o	
		P M	Q	R N	S G	T I	U ↑ K	v	w	X Q	Y	z			

CIPHER SOLVED: _____

CIPHER THREE WORD: _____

A	B	C	D	E	F	G	H	I	J	K	L	M	N	o
Y	S	J	R	0	E	A	н	В	L	F	M	v	w	C
		P	Q	R	s	T	υ	v	w	ж	Y	Z		
		^	↑	A	↑	<u> </u>	↑	↑	↑	^	<u> </u>	1		
		\downarrow												

CIPHER SOLVED: _____

CIPHER FOUR WORD: _____

A	B	J C	D	E	F A	G ↑ ↓ Y	H	I B	J L	K ↑ ↓ F	L w	M ↑ V	N ↑ • •	• ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ←
		P	Q D	R N	s ← G	T	U	v	w m	X Q	Y	z		

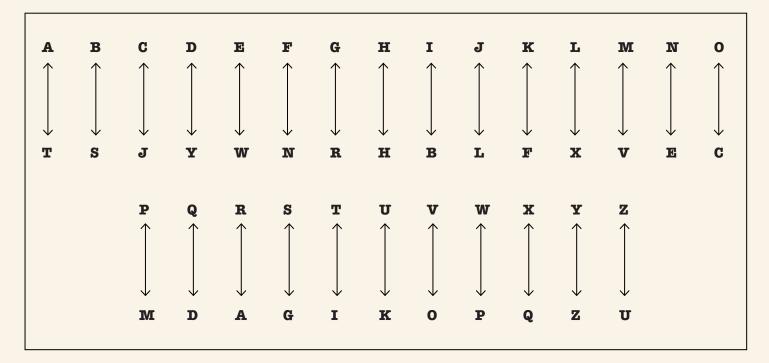
CIPHER SOLVED: _____

CIPHER FIVE WORD: _____

A	B	c	D	E	F	G	H	I	J	K	L	M	N	o
T	S	J	R	E	A	Y	H	В	L	F	W	v	0	C
		P	Q	R	s G	T N	v ↑ k	v	w	X Q	Y	z		

CIPHER SOLVED: _____

CIPHER SIX WORD: _____



CIPHER	SOLVED:	

FINAL CIPHER DECODED MESSAGE:



TEACHER ANSWER KEY

HISTORY OF WOMEN CODEBREAKERS

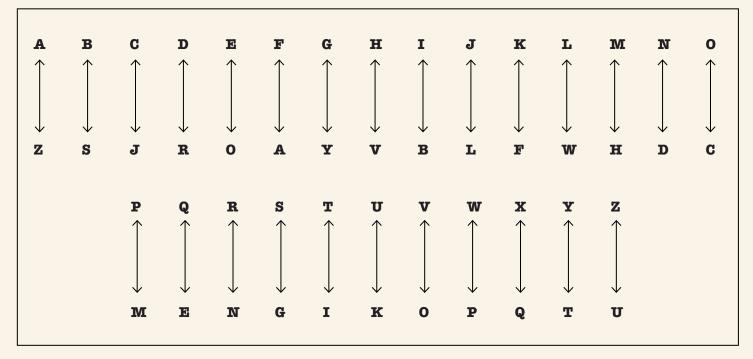
Instructions: Using the answers to the questions, you will decode the message from the high German command. Compared to the complex codes of World War II, this is easy. Decode the message in each word by substituting the coded letter in the top row that corresponds to the letter on the bottom. The answers to the questions from the Student Handout are your ciphers. NOTE: The decoded cipher will include the word needed to solve the cipher. This is where recognizing patterns (or in this case a word) comes into play.

Sample Code (Using Cipher One): LFHQB

Decoded: WAVES

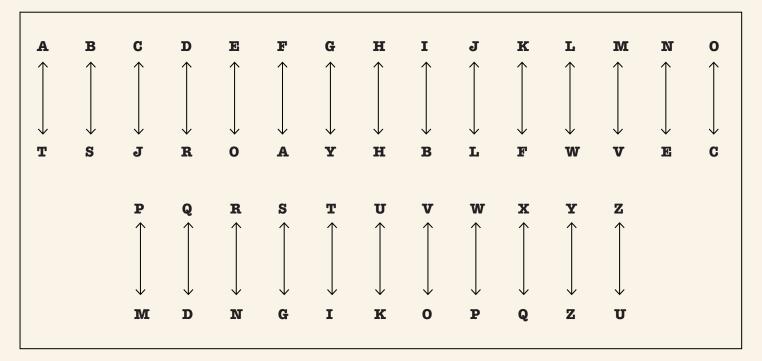


CIPHER ONE WORD: SECRET



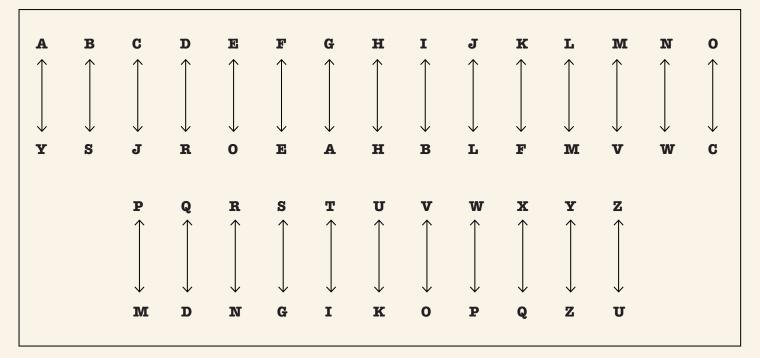
CIPHER SOLVED: WOMEN

CIPHER TWO WORD: WASHINGTON DC



CIPHER SOLVED: BREAK VITAL

CIPHER THREE WORD: PATTERNS



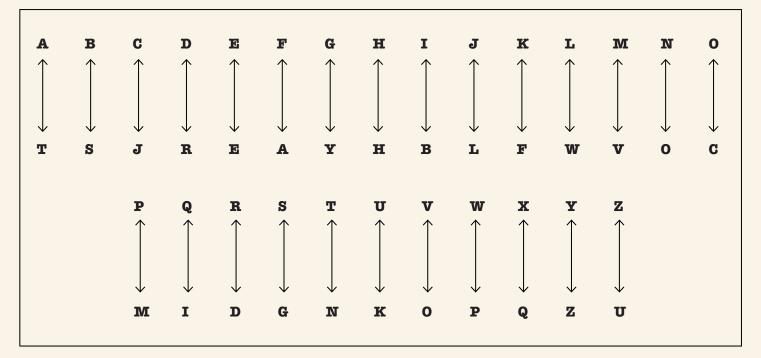
CIPHER SOLVED: CODES

CIPHER FOUR WORD: PURPLE

A	B	J	D	E	F A	G ↑ ↓ Y	H	I B	J	K ↑ ↓ F	L ↑ W	M ↑ V	N ↑ ↓ E	O	
		P	Q D	R N	s ← G	T I	U ↑ T	v	w m	ж	Y	z			

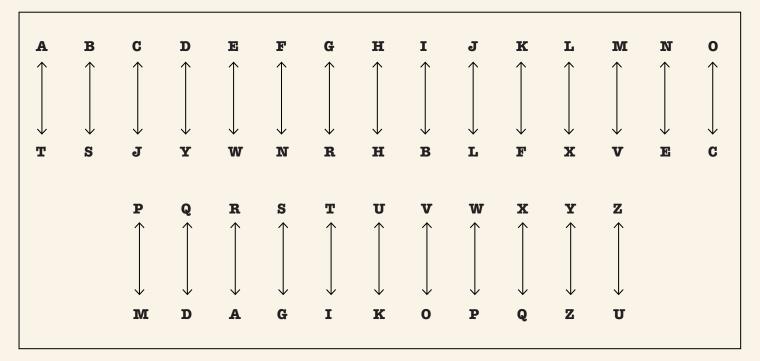
CIPHER SOLVED: _____TO

CIPHER FIVE WORD: CENTER



CIPHER SOLVED: WIN

CIPHER SIX WORD: SEGREGATED



CIPHER SOLVED: WAR

FINAL CIPHER DECODED MESSAGE:

WOMEN BREAK VITAL CODES TO WIN WAR

