Brains Over Bullets: The Secrets of WWII

Name:_____Period:_____

This tasksheet is designed to complete while watching the NOVA special presentation of "Decoding Nazi Secrets." A full transcript of this presentation can be found at http://www.pbs.org/wgbh/nova/transcripts/2615decoding.html

1. What was Churchill's secret weapon?
   The codebreakers of Bletchley Park
2. What was the name of the German's seemingly invincible codemaking machine?
   Enigma
3. What was the name of the special British Intelligence unit that moved into Bletchley Park?
   Government Code and Cipher School (GC&CS)
4. What was Bletchley Park's code name?
   Station X
5. What kinds of people were hired to be a part of the Bletchley Park codebreaking team?
   Crossword fanatics, chess champions, mathematicians, students, professors, Americans, British, anthropologists, Egyptologists, paleontologists, lawyers
6. If the work at Bletchley Park were to succeed, what was essential?
   Absolute Secrecy
7. How many different ways could the Enigma code messages?
   150 million million million
8. What was the purpose for which the Enigma was first developed?
   It was a commercial encryption device.
9. What three adjustments had to be made to the Enigma so that the sender's and receiver's machines would match?
   1)which rotors to put in the machine and their order 2)adjust the ring of letters around the rim of each rotor 3)plugboard
10. What did the codebreakers have to have in order to even begin breaking the enigma codes?
    exact key

11. Who finally bought the 300 Enigma documents being sold secretly by a hard-up German army clerk?
The Poles

12. How had the Germans wired the Enigma's keyboard to the first rotor?
ABCD

13. What change did the Germans make to the Enigma in 1939 that caused the Poles to no longer be able to read any of the messages?
They added an extra choice of rotors

14. What was to become the Enigma's Achilles' heel?
The double indicator…the operator would send the secret 3 letter setting twice to ensure that the receiver got it

15. What were the huge cards called which had holes punched in them to represent the wheel positions that could produce females?
Jefferies sheets

16. How did Admiral Cunningham act on the message of the Italians planned convoy attack without giving his plans away?
He lead the enemy to think he was socially engaged by going ashore to play golf. He snuck back onboard at night and led the British fleet out to sea, catching the Italians off guard.

17. What change did the Germans make to plunge Bletchley park in the dark again?
No more double enciphering of the message setting.

18. Hut 6 in Bletchley Park was concentrating on which Enigma code?
The Air Force Enigma (Luftwaffe's code, RED)

19. What was Herivel tip which allowed Hut 6 to begin breaking the Air Force code again?
If the operator failed to spin his rotors as he should, the three letters he was sending over the airwaves uncoded would be the secret ring setting

20. Even though they were successful in breaking the Luftwaffe RED (air force) code, which enigma code were they still unable to break?
The Enigma of the German Navy

21. What mind held the key to breaking the Enigma?
Alan Turing

22. Who invented the first basic concept of a computing machine?
Alan Turing

23. How did the Germans hide their crucial message setting for their U-boat messages?
Rather than letting the operator choose three letters at random for the setting, they used a secret set of bigram tables.

24. To avoid the risk of exposure, all information resulting from Bletchley Park decodes bore what top secret rating?
Code word Ultra

25. What two key factors allowed Bletchley Park to crack the naval Enigma?
Recovering U-Boat documents AND knowing that every letter typed into the Enigma was replace with a different letter.

26. What was the name for particular phrases known to be in a particular encrypted message?
Cribs

27. What did Bletchley Park refer to as gardening?
They would send messages that they knew the Germans would break. Then they listened to the German radio transmissions, knowing that this crib message was being retransmitted in code.

28. What was the one major weakness to Rommel's strategy?
He relied totally on the Italians to bring his forces supplies.

29. In order to keep Ultra safe, what did the British do so that the Germans would not be suspicious of their code being broken?
They always sent a plane in the direction of convoys so it appeared that the plane had located them rather than codebreakers.

30. How were the Germans able to break the diplomatic code used to convey messages to Washington?
The Italian secret service broke into the US embassy and stole the code book used to encipher all US diplomatic messages. They copied the book and then returned it without anyone knowing.

31. How long did it take the codebreakers at Bletchley Park to crack the daily rotor settings of the Enigma by hand?
6 to 12 hours

32. What was the name of Turing's computing machine?
The Bomb

33. On average, how long did it take the Bomb to find the daily rotor settings of the Enigma?
15 minutes

34. How many of Turing's Bombs were being used by the end of the war?
200

35. What name did the naval Enigma team at Bletchley Park give to the German's U-boat enigma code?
shark

36. What abrupt change in the U-Boat code once again plunged Bletchley Park into darkness?
added a fourth rotor to the enigma machine

37. What critical weakness was found in the four-rotor system?
The new enigma had to still be able to communicate with 3-rotor enigmas. So there had to be a special setting on fourth enigma that would allow the new enigmas to function like the 3-rotor enigmas.

38. What was the name of the US code breaking unit?
Arlington Hall (later called National Security Agency)

39. What was the name of the machine that Hitler had created for the German high command that was faster and even more secure than the Enigma?
Lorenz

40. How many rotors did the Lorenz use?
12

41. What name did Bletchley Park give to the mysterious code made by the Lorenz? *FISH*

42. How did a lazy German operator give the whole game away and allow the Lorenz to be broken?
An operator sent a 4000 word message twice using the same starting machine settings (using abbreviations the second time)

43. What was the name of Bletchley Park's replica of the Lorenz?
The Tunny

44. Even with a replica of the Lorenz machine, how long did it take the Allies' code breakers to crack a particular message?
About a month

45. Who built the worlds first programmable computer for the purpose of automating the hunt for the Fish settings?
Thomas Flowers

46. How many of these computers were in use by the end of World War II?
10

47. What was the name of Flowers' machine?
Collosus

48. With the help of the Colossus, how long did it take for the code breakers at Bletchley Park to crack a particular message coded with the Lorenz machine?
Minutes

49. How fast could the tape in Flowers' machine move through the optical reader?
30 miles per hour

50. How long were those at Bletchley Park who knew about the invasion not allowed to leave the building?
48 hours

51. The operations at Bletchley Park were to be kept a secret for how many years?
30 years

52. What was the fate of the 10 Colossus machines used by Bletchley Park?
All but 2 destroyed immediately after war. The British secret service used these during the cold war, but eventually destroyed them also.