

# ALAN TURING: TRUE TO HIMSELF



## OVERVIEW

Alan Turing (1912-1954) was an accomplished British mathematician, logician, cryptanalyst, philosopher, physicist, and biologist. He is often referred to as the father of the modern day computer and is credited with breaking the Nazi Enigma Code. WWII British cryptographer Captain Jerry Roberts is quoted as saying, "Without him – we would have lost the war."<sup>i</sup> Soon after the end of the war, the British government awarded Turing with the Order of the British Empire for his contributions.

Turing was also openly gay and in the early 1950s was arrested and punished for his sexual orientation by the same government he served.

From his earliest days in school to his enduring legacy, Turing faced many challenges, yet, stayed true to himself by pursuing his love of science and living an open, honest life.

*True to Himself* provides secondary educators with student handouts, suggested discussion questions, extension ideas and additional resources to help students learn more about this extraordinary man and the context in which he lived.

## AGE/EXPERIENCE LEVEL

Grades 9-12

## SUGGESTED DISCUSSION TOPICS

Invite students to read the included biography and/or additional background information on Alan Turing. Then, lead a class discussion using the suggested topics and questions below as a guide.

1. Turing's early school experiences were not very positive. Some teachers recognized his high intelligence but did not respect it. His report card was filled with criticism. Ranked at the bottom of his class, one English teacher wrote, "I can forgive his writing, though it is the worst I have ever seen, and I try to view tolerantly his unswerving inexactitude and slipshod, dirty, work, inconsistent though such inexactitude is in a utilitarian; but I cannot forgive the stupidity of his attitude towards sane discussion on the New Testament."<sup>ii</sup>

- How closely do your teachers' impression of you and your capabilities match who you think you really are? How much does school experience define our accomplishments as people? Where else do we and should we look to measure our achievements and growth as people?
2. When the police arrested Turing in 1952 on charges of "gross indecency," he never denied being gay. According to biographer Andrew Hodges, "He was particularly concerned to be open about his sexuality even in the hard and unsympathetic atmosphere."
    - What do you think motivated Turing to be so honest, especially when threatened with criminal punishment? What did he gain and/or lose because of this? Have you ever been confronted with the choice of standing up for yourself knowing that you would face negative consequences? If so, how did you choose what to do and would you respond the same way if faced with the same situation today?
  3. Even though Turing's code-breaking abilities helped Britain and Allied Forces defeat Germany in WWII, he was later stripped of his security clearance and barred from intelligence work. One reason for this was the idea that being gay made him a security risk. Around the same time in the U.S., LGBT people were treated similarly.
    - What was your reaction to this part of his story? Why do you think the British government considered Turing, and other gay people, a security risk? What groups in our current society are considered dangerous or threats to national security?
  4. The central concept of modern computers are based on some of Turing's scientific theories. Since he died in 1954, Turing never saw a laptop, iPad or cell phone.
    - In what ways do you use computers in your daily life? What do you think it would be like to live in a world without computers? What do you think Turing would think if he could spend a day with you learning about modern technologies that he helped inspire?
  5. Many students learn about Turing in science, computer or history classes but most never know that he was openly gay.
    - Why do you think his sexual orientation is often excluded from lessons about his life and accomplishments? Why might it be important to learn about the various identities of historical figures? What harm might come from not learning this information?

## SUGGESTED ACTIVITIES AND ASSIGNMENTS FOR EXTENDED LEARNING

- Research key points in the UK's history of criminalizing and decriminalizing homosexuality, specifically Section 11 (known as the Labouchere Act) of the Criminal Laws Amendment Act of 1885, the Montagu trial in 1954, the 1957 Wolfenden report, and the 1967 Sexual Offences Act. Compare them with U.S. history of criminalizing and decriminalizing homosexuality (e.g., Illinois was first state to criminalize homosexuality in 1827 and was the first state to repeal it in 1962, and the various U.S. Supreme Court cases leading up to and including Lawrence v. Texas (2003)).
- Research McCarthyism and the “Red Scare” in the U.S. during the 1950s. Answer the following questions: How does this mirror what Turing faced at the same time in Britain? What was happening in the U.S. politically at that time? Which public figures fueled the “Red Scare”? Who was accused of being a communist or subversive, and why? Why were homosexuals targeted? Assign students to compare this era to others in which certain groups were considered dangerous or anti-American (e.g., the Salem Witch Trials, Japanese American Internment, anti-Muslim sentiment post-9/11).
- Read former British Prime Minister Gordon Brown's 2009 apology to Turing on behalf of the British Government at <http://www.telegraph.co.uk/news/politics/gordon-brown/6170112/Gordon-Brown-Im-proud-to-say-sorry-to-a-real-war-hero.html>. Note: Turing wasn't officially pardoned for his conviction until 2013. Write a persuasive essay using one or more of the following prompts: Why do you think governments sometimes make apologies for past wrongdoings, what impact do they have and who stands to benefit? What historic events do you think the U.S. should apologize for and why?
- After the Allies won WWII and liberated concentration camps across Europe, the Allied Military Government of Germany (controlled by Britain, France, Russia and the U.S.) repealed many laws and decrees that were created under Nazi Germany. However, the 1935 Nazi revision of Paragraph 175 criminalizing homosexuality was not one of them. As a result, many Holocaust survivors who were identified as LGBT, particularly gay men, were forced to complete their terms of imprisonment even after the war and regardless of how long they had been imprisoned in the concentration camps. Research Paragraph 175 and the stories of LGBT Holocaust survivors that were forced to remain in prison after the end of the war.
- Although Turing was pardoned in 2013, many felt that only pardoning one man because of his contributions was unfair to the thousands of other men who were convicted because they were gay under the same laws. In a public show of support for

the pardon of the others, UK pop group The Pet Shop Boys composed and performed an “orchestral pop ‘biography’” entitled “A Man from the Future” based on the life of Alan Turing in July 2014 on the BBC. The piece references those who have yet to receive any pardon. Learn more about “A Man from the Future” (see: <http://www.geowayne.com/newDesign/amanfromthefuture.htm> for commentary of the piece), and think of examples of how art has and can serve as a powerful tool to reflect and respond to social issues. (Note: At the time of this publication, a recording of this piece was yet to be released.)

- Turing’s skill as a cryptanalyst (one who solves secret messages, codes, and encryptions) was instrumental in the defeat of Nazi forces. Collect and share books with your students that explore cryptology, assign various encryptions to solve and invite students to design their own encrypted messages. Consider submitting encrypted messages and keys to the school newspaper for a school-wide decoding contest.

## ADDITIONAL RESOURCES

### WEBSITES

- Alan Turing by Biography.com: <http://www.biography.com/people/alan-turing-9512017>
- Alan Turing: The Enigma by Andrew Hodges: <http://www.turing.org.uk/index.html>
- The Turing Digital Archives: <http://www.turingarchive.org/>
- History of Lesbian, Gay and Bisexual Equality by Stonewall: <http://www.stonewall.org.uk/at-home/history-of-lesbian-gay-and-bisexual-equality/default.asp>
- Cryptographic Protocols by Computer Science Unplugged: <http://csunplugged.org/cryptographic-protocols>
- Cryptography 101: Basic Solving Techniques for Substitution Ciphers by Denise Sutherland and Mark Koltko-Rivera: <http://www.dummies.com/how-to/content/cryptography-101-basic-solving-techniques-for-subs.html>
- Decrypting Cryptographic Ciphers by Dummies.com: <http://www.dummies.com/how-to/content/decrypting-cryptographic-ciphers.html>
- Mind of a Codebreaker by NOVA: <http://www.pbs.org/wgbh/nova/decoding/mind.html>
- How the Enigma Works by Alan Stripp from NOVA: <http://www.pbs.org/wgbh/nova/military/how-enigma-works.html>

## BOOKS

- Alan Turing: The Enigma: The Book the Inspired the Film “The Imitation Game” (2014) by Andrew Hodges

## FILMS

- The Imitation Game (2013) directed by Morten Tyldum (drama)
- Codebreaker: The Story of Alan Turing (2013) directed by Clare Beavan (drama-documentary)
- Decoding Nazi Secrets (1999) by NOVA (documentary)

## PLAYS

- Breaking the Code (1986) by Hugh Whitmore

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<sup>i</sup> BBC. (2009 September 15). Without him – we would have lost the war. BBC.co.uk website.

[http://www.bbc.co.uk/threecounties/content/articles/2009/09/07/captain\\_jerry\\_roberts\\_feature.shtml](http://www.bbc.co.uk/threecounties/content/articles/2009/09/07/captain_jerry_roberts_feature.shtml).

<sup>ii</sup> Hodges, Andrew. (n.d.). Empire of the mind: Alan Turing’s early life, 1912-1928. The Alan Turing Internet Scrapbook. <http://www.turing.org.uk/scrapbook/early.html>.

<sup>iii</sup> United States Holocaust Memorial Museum. (n.d.). 12: Aftermath. Nazi Persecution of Homosexuals 1933-1045. <http://www.ushmm.org/exhibition/persecution-of-homosexuals/>.

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## STUDENT HANDOUT

Alan Turing was born in London on June 23, 1912 and while growing up he showed an enthusiastic interest in science. He read about it on his own and conducted chemistry experiments at home. Turing's interests and curiosity, however, were not actively nurtured by his family or his teachers. His mother worried that he would not be accepted into the best schools, which trained students to be go into business and government administration (not science). While he did successfully enter the prestigious Sherborne School and some of his teachers knew that he was smart, he did not do well in his classes and was generally considered a poor student.

When Turing went to King's College in 1931, his intellectual curiosity was finally encouraged and he excelled. In 1936, at the age of 24, he presented the notion of a single machine (later called the Turing Machine) that could perform multiple tasks, including numerical work, algebra, code breaking, file handling, and could even play chess. The central concept of modern day computers is based on his ideas. Turing then went to America to attend Princeton University and earned his Ph.D. in 1938.

Back home after graduate school, Turing turned his attention to cryptology, the study of codes. When Britain declared war against Germany in September 1939, Turing took up full-time work at the wartime cryptanalytic headquarters of Bletchley Park. He led the group responsible for deciphering secret German naval signals, made with a machine called the German Enigma. Turing's mathematical and cryptological knowledge and skills helped break the German code, which was considered unbreakable. This important contribution, and others that he made, allowed Allied forces to defeat Germany in crucial engagements eventually win WWII. For his efforts, Turing received prestigious awards and accolades and fellow British cryptographer, Captain Jerry Roberts, is quoted as saying, "Without him – we would have lost the war."

Following WWII, Turing worked at the National Physical Laboratory in London where he led the design work for the Automatic Computing Engine (ACE) and created the groundbreaking blueprint for store-program computers. The concept has been used as a model by technology corporations and influenced the development of the world's first personal computer decades later. His continued interest in math and computers led him to hold high-ranking positions at the University of Manchester in the late 1940s. There, Turing introduced the concept of artificial intelligence and proposed an experiment known as the "Turing Test" which attempts to define a standard for a machine to be called "intelligent" and still influences scientific debates over artificial intelligence.

In January 1952, Turing called the police to report a break-in at his house. During the investigation, he admitted to being in a relationship with another man. Because British law at the time, Section 11 of the Criminal Laws Amendment Act of 1885, criminalized homosexuality, Turing was arrested for what was termed “gross indecency”. When convicted, Turing was given a choice, prison or probation. He chose probation, but that option had an additional requirement of a one-year course of hormonal treatment intended to eliminate his attraction to men.

The conviction, along with the Cold War atmosphere of fear and distrust at the time, led to the removal of Turing’s security clearance and barred him from continuing his cryptographic work for the British intelligence agency. He was also denied entry into the U.S. True to his passions, however, Turing continued his academic work by pursuing other avenues of science. Moving forward, he did his best to make a joke of the criminal trial and refused to show any shame or remorse for breaking a law he regarded as absurd.

Two and a half years after his arrest, Turing died by suicide on June 8, 1954. He was 16 days shy of his 42<sup>nd</sup> birthday.

Despite his criminal conviction and tarnished reputation, Turing’s legacy lives on. Statues, plaques, university buildings, plays, books, movies and many other tributes pay respect to him across the globe. *Time* magazine named him one of its “100 Most Important People of the 20<sup>th</sup> Century,” saying “The fact remains that everyone who taps at a keyboard, opening a spreadsheet or a word-processing program, is working on an incarnation of a Turing machine.”<sup>ii</sup>

On September 10, 2009, after community pressure and a petition with more than 30,000 signatures, British Prime Minister Gordon Brown released a statement on behalf of the British government, posthumously apologizing to Turing, saying “We’re sorry, you deserved so much better<sup>iii</sup>.” On December 24, 2013, Queen Elizabeth II signed a pardon for Turing’s conviction of gross indecency, which became official in August 2014. The Queens’ action was only the fourth royal pardon granted since the end of WWII.

Turing’s contributions to the world were many; he broke the Enigma Code, developed theories that are the basis of modern computing and influenced scientific exploration of artificial intelligence. He was also punished for being gay by the very government that he worked all his life to serve. A hero to scientists, soldiers and advocates, Alan Turing followed his heart in work and life and remained true to himself to the very end.

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<sup>i</sup> BBC. (2009 September 15). Without him – we would have lost the war. BBC.co.uk website.

[http://www.bbc.co.uk/threecounties/content/articles/2009/09/07/captain\\_jerry\\_roberts\\_feature.shtml](http://www.bbc.co.uk/threecounties/content/articles/2009/09/07/captain_jerry_roberts_feature.shtml).

<sup>ii</sup> As quoted in Alan Turing. (2015). The Biography.com website. <http://www.biography.com/people/alan-turing-9512017>.

<sup>iii</sup> Brown, Gordon. (2009 September 10). Gordon Brown: I'm proud to say sorry to a real war hero. The Telegraph website.

<http://www.telegraph.co.uk/news/politics/gordon-brown/6170112/Gordon-Brown-Im-proud-to-say-sorry-to-a-real-war-hero.html>.