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(Disclaimer: Many topics related to the science of the Holocaust are complex, involve cruelty, deal with race or medical experimentation, and challenge student sensitivity. We ask that you use a “gentle in/gentle out, grade/maturity-appropriate view to teaching any Holocaust topic.)

DNA and Eugenics in Nazi Germany

Document 1: Excerpt from Adolf Hitler's *Mein Kampf*

“What we must fight for is to safeguard the existence and reproduction of our race and our people, the sustenance of our children and the purity of our blood, the freedom and independence of the fatherland, so that our people may mature for the fulfillment of the mission allotted it by the creator of the universe.”

-Adolf Hitler, *Mein Kampf* Translated by Ralph Manheim (Boston: Houghton Mifflin, 1971), 71.

Document 2:

German scientists, embracing eugenics, legitimized the racial ideology of the Nazi movement, and thus provided the “scientific” basis for radical policies of exclusion and mass murder. The eugenic movement was founded in the 19th century by the British naturalist Francis Galton, and had spread by the early 20th century to the United States and most European countries. Asserting that the discoveries of Charles Darwin could be applied to humans, the proponents championed social policies that would improve the human race through controlled breeding. Linking heredity not only to disease and retardation, but also crime and anti-social behavior, they advocated limitations on the reproduction of humans considered inferior. The founders of eugenics were social activists and not specialists in biology or genetics, but the movement eventually attracted leading scientists from the fields of genetics, anthropology, and

psychiatry. Although the “science” of eugenics was flimsy when viewed from the vantage point of post-DNA genetics, it relied on scientific practices considered standard in its time.

Throughout Nazi Germany, racial “experts” examined eye color and hair color, and measured facial dimensions to determine whether or not individuals were racially “Aryan.” The term “Aryan” originally referred to peoples speaking Indo-European languages. The Nazis perverted its meaning to support racist ideas by viewing those of Germanic background as prime examples of “Aryan” stock, which they considered racially superior. For the Nazis, the typical “Aryan” was blond, blue-eyed, and tall. Many Nazi laws and decrees applied differently to persons they labeled as “superior” and “inferior.” While individual Germans tried to prove their “superior” race, the regime was determined to identify persons of “inferior” race.

-Washington, D.C.: US Holocaust Memorial Museum

Document 3:



Questions

1. From whom does Hitler think Germany and the German people must be protected?
2. What is Hitler safeguarding?
3. Why is Document 1 an example of racist ideology?
4. In your own words, define eugenics and explain its use?

5. According to the readings, what were the proposed benefits of eugenics?
6. How did the Nazis use eugenics to fulfill their agenda?
7. What is the danger of pseudo-science?
8. What is happening in the picture (Document 3)?

Extension

Document 4

The Nuremberg Laws, as they became known, did not define a "Jew" as someone with particular religious beliefs. Instead, anyone who had three or four Jewish grandparents was defined as a Jew, regardless of whether that individual identified himself or herself as a Jew or belonged to the Jewish religious community. Many Germans who had not practiced Judaism for years found themselves caught in the grip of Nazi terror. Even people with Jewish grandparents who had converted to Christianity were defined as Jews.

-Washington, D.C.: US Holocaust Memorial Museum

Science experiment:

Using the ideas of the Nuremberg Laws, give students 4 grandparents, each with distinct genetic qualities, and ask them to determine the odds that a grandchild would show as the Nazi ideal: blonde hair/blue eyes.

Answer Key

1. Jews, "inferior" people, non-Aryans, etc.
2. Their race and people, i.e. Aryans, purity of blood, the fatherland
3. Answers will vary, but could include things such as protection of Aryans and the idea of Germany for Germans
4. Answers will vary
5. "Inferior" peoples will no longer exist, Germany will now be a homogenous country, reduce crime rate and criminals, reduction and eventual eradication of diseases and mental and physical handicaps
6. They used it as an excuse to commit genocide against undesirables including Jews, Gypsies, Eastern Europeans, and the mentally and physically handicapped

7. Answers will vary but could include ignoring of ethics, harming people, a step backwards in the scientific community, perpetuation of myths
8. This photograph shows Dr. Sophie Ehrhardt (on the right), a staff member of Robert Ritter's Eugenic and Criminal Biological Research Station (Rassenhygienische und Kriminalbiologische Forschungsstelle), at the Reich Health Office, Berlin, matching a Gypsy woman's eye color with samples on an eye color chart, ca. 1939. Original photograph in color. Photographer unknown. Courtesy of Bundesarchiv Koblenz, R 165.

Simply put, this photo is an example of eugenics at work

*Selected questions taken from the Holocaust Education Center

Technology in the Holocaust

IMB and the Hollerith Machine

Document 1

All governments gather information about their citizens. The Nazi regime, however, used such information to track political opponents, enforce racial policies, and, ultimately, implement mass murder. As early as 1934, various government bureaus began to compile card catalogs identifying political and racial enemies of the regime, such as Freemasons, Jews, Sinti and Roma (Gypsies), and the “genetically diseased” persons. The 1939 census became the basis for a national register of Jews. That year, German census became forms for the first time included explicitly racial categories. Jews were identified not only by religious affiliation, but by race as well. Within three years, the completed national register of Jews and some Jewish *Mischlinge* (“mixed breeds”) was to become one of the sources for Nazi deportation lists. Most of those deported perished in the Holocaust.

During the 1930s and 1940s, Hollerith machines were the best data processing devices available. The Nazi regime employed thousands of people from 1933 to 1939 to record national census data onto Hollerith punch cards. The SS used the Hollerith machines during the war to monitor the large numbers of prisoners shipped in and out of concentration camps. The machines were manufactured by DEHOMAG- Deutsche Hollerith Maschinen Gesellschaft or German Hollerith Machine Company, a subsidiary of IBM since 1922.

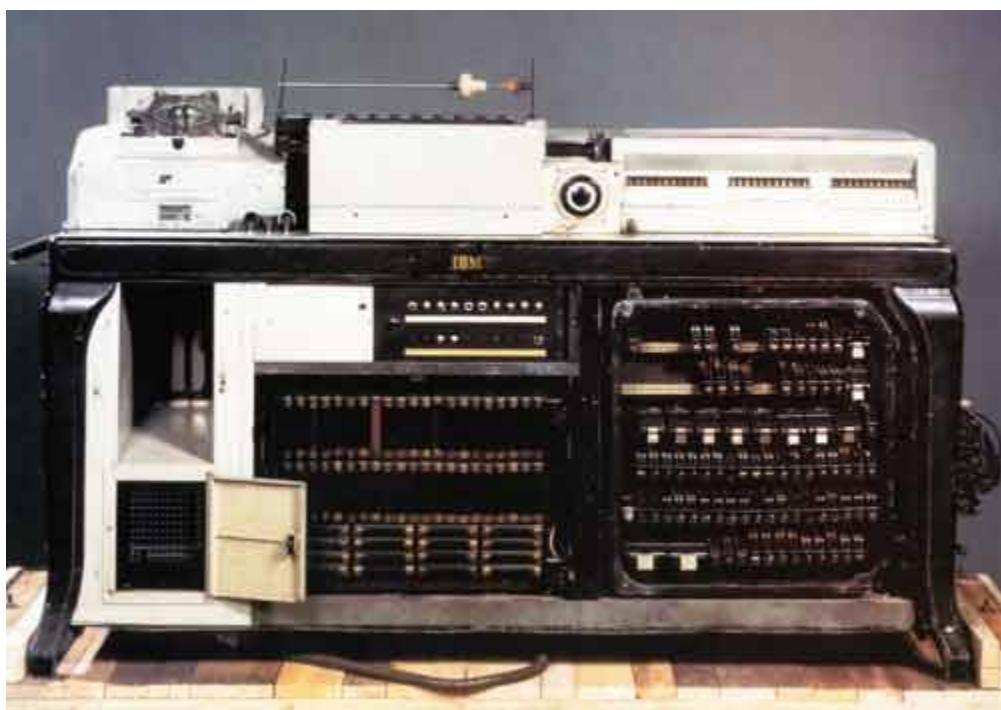
Document 2

Hollerith Machine Punch Card



Document 3

Hollerith Machine



Ideas

Discuss the impact of technology during the Holocaust

Discuss how the Hollerith Machine is a precursor to modern technology

Create a Hollerith Punch card using any or all of this categories that the Nazis used:

Year of birth, Place of birth, Profession, Marital status, religious affiliation, Year of marriage, Total male children, Total female children, Living male children, Living female children, Male siblings, Female siblings, National Labor Service, Served, Unit, Nationality, District of Origin-Father, District of Origin-Mother, Month of entry into military service, Year of entry into military service, Distinguishing characteristics, Height, Weight, Racial elements.

Or you can make up your own categories that are more applicable to the students' lives

Epidemic, Plague, and Infection

Subject: Science

Grade Levels: 3 through 12

Objectives:

- For students to recognize disease vectors (pathways) and risk factors for infectious disease

Sunshine State Standards:

- Grades 3-5
 - SC.G.1.2.1
- Grades 6-8
 - SC.F.1.3.2, 1.3.3
- Grades 9-12
 - SC.F.1.4.1

Background:

In Nazi death camps, typhus was spread by lice. Transmission of typhus from human to human increases under conditions of crowded living arrangements, famine, war or any circumstances that lead to heavy infestation with lice. When the louse sucks the blood of a person infected with the parasite causing typhus, the parasite remains in the louse and grows. When the louse is transmitted to another person through contact or clothing, the louse bites the person. The infected feces from the louse are rubbed into the wound, rubbed into the eye, or inhaled. Each situation results in human infection. The symptoms of typhus appear abruptly, with severe headache,

generalized aches and pains and chills. A fever follows and a rash (lasts for 1-2 weeks) appears over the entire body except for the face, palms of the hands and soles of the feet. The flu-like symptoms can progress to a delirious state and stupor and, without treatment, can result in coma and death.

In ghettos, typhoid spread through contaminated drinking water. Typhoid fever is a life-threatening illness caused by the bacterium *Salmonella Typhi*. *Salmonella Typhi* lives only in humans. Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract. In addition, a small number of persons, called carriers, recover from typhoid fever but continue to carry the bacteria. Both ill persons and carriers shed *S. Typhi* in their feces (stool). You can get typhoid fever if you eat food or drink beverages that have been handled by a person who is shedding *S. Typhi* or if sewage contaminated with *S. Typhi* bacteria gets into the water you use for drinking or washing food. Once *S. Typhi* bacteria are ingested, they multiply and spread into the bloodstream. The body reacts with fever and other signs and symptoms.

Materials:

Sets of 10 small colored objects for each student, such as colored paper or colored paper clips. Each student needs 10 of the same color, and at least 6 different colors need to be included. Identify the least common color as the disease carrier color, but don't let the students know which color it is.

Procedure:

- Have students trade tokens with 10 other students. Color does not matter during trading.
- After trading is completed, identify the disease carrier color, and ask how many students now have that color. This activity simulates the spread of infectious disease from carriers to victims.
- Discuss the crowded and unsanitary conditions in the European ghettos and concentration camps where Jews and others were segregated by the Nazis. Bring up the difficulty of avoiding disease in such conditions, especially with inadequate heating and diet.

[A Teacher's Guide to the Holocaust](#)

Produced by the Florida Center for Instructional Technology,
College of Education, University of South Florida © 1997-2013.

Population Density in the Ghettos

Subject: Science/Math

Grade Levels: 3 through 12

Objectives:

- to make calculations of population density
- to recognize the stressful conditions experienced by European ghetto dwellers due to high population density and scarcity of resources.

Sunshine State Standards:

- Grades 3-5
 - MA.1.2.2
 - MA.A.3.2.2, 3.2.3
- Grades 6-8
 - MA.1.3.2
 - MA.A.3.3.2, 3.3.3
 - MA.D.1.3.1, 1.3.2
 - MA.E.1.3.1
- Grades 9-12
 - MA.1.4.2
 - MA.A.3.4.2, 3.4.3
 - MA.D.1.4.1
 - MA.E.1.4.1

Background:

The St. Petersburg-Tampa urban area covers 650 square miles with a population of about 2,200,000 people. Pinellas is the most densely populated county in the state of Florida. To calculate the population density, expressed in people per square mile, divide the number of people by the number of square miles. Florida's population is about 15 million, with land of 58,664 square miles. By the year 2025, Florida will probably be home to 21 million. Los Angeles, the most densely populated US region, has approximately 12 million people living in almost 2000 square miles of space. The US population is about 270 million people, with 3,618,770 square miles of land. In 2025, the US is projected to have 335,050 million people. Worldwide, there are 5840 million people occupying land area of 51,673,874 square miles. By the year 2025, the Earth is expected to have over 8000 million human residents.

During the Nazi occupation of Poland, 230,000 Jews were forced to live in a ghetto in Lódz, Poland. By the end of 1939, the 4.3 square kilometer ghetto was occupied by an average of 3.5

people per room. In 1941, 25,000 additional people were brought to the ghetto to live. By October of 1940, Nazis had confined nearly 400,000 Jews in a 3.5 square mile area of Warsaw which normally housed about 160,000. The area was surrounded by a wall 10 feet high and was sealed off on November 15, 1940. Jews were forbidden to go outside the area on penalty of being shot on sight. No contact with the outside world was allowed.

Materials:

- World Almanac or Internet sites for finding population density data for US and world regions

Procedure:

- Given the population data provided above, have students compare the population densities of Tampa-St. Pete to other US and world areas.
- Have students compare the population densities of their own area to other US and world areas.
- Calculate the population density of the school, by converting the building square footage to square miles. One square mile contains 27,878,400 square feet.
- Use graphs to visually display comparisons. Calculate the population density of Lódz in 1939 and 1941, and in Warsaw in 1940.
- Discuss how the students feel to live and work in very crowded situations. Include discussion of sharing resources and shortages under crowded conditions.

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Starvation in the Ghettos

Subject: Health/Science

Grade Levels: 3 through 12

Objectives:

- to investigate how human beings survive under camp and ghetto life's extreme conditions by examining the set rations
- to recognize the suffering and loss of life experienced in Holocaust ghettos due to food rationing
- to identify the basic food groups, USRDA requirements and compare those to rations of ghetto and camp inmates

- to recognize the importance of adequate nutrition.

Sunshine State Standards:

- Grades 3-5
 - HE.A.1.2.10
- Grades 6-8
 - HE.A.1.3.10
- Grades 9-12
 - HE.A.1.4.2

Background:

Starvation of ghetto residents was a deliberate Nazi policy. The amount of food the ghetto was allowed could change from week to week, sometimes from day to day. The official weekly ration for the Jews was very small. At times, it was no more than 1,100 calories a day. Often, not even that much food was made available. For one particular week each Jew was allowed: Bread 14.0 oz., Meat products 4.5 oz., Sugar 1.75 oz., Fat 0.9 oz.. At that rate, the Jewish ration was only about 350 calories a day. A sedentary adult needs about 2,000 calories to maintain his weight. A thirteen-year-old boy needs about 3,000 and a baby needs 1,200. With much less than those amounts, the body loses weight quickly. After a certain point, the body survives by digesting muscle. Painful death from starvation comes not long after that.

Materials:

- US Department of Agriculture Food Pyramid and recommended daily calorie requirements (available on the Web, in encyclopedias, and on food labels)
- reference material on malnutrition
- excerpt from *Man's Search for Meaning*
- paper
- pens
- ruler

Procedure:

- Read the following excerpt from Victor Frankl's *Man's Search for Meaning*:

During the latter part of our imprisonment, the daily ration consisted of very watery soup given out once daily, and the usual small bread ration. In addition to that, there was the so-called "extra allowance," consisting of three-fourths of an ounce of margarine, or a slice of poor quality sausage, or of a little piece of cheese, or a bit of synthetic honey, or a spoonful of watery jam, varying daily. In calories, this diet was absolutely inadequate, especially taking into consideration our heavy manual work and our constant exposure to the cold in inadequate clothing. The sick who were "under special care"--that is, those who were allowed to lie in the huts instead of leaving the camp for work--were worse off.

When the last layers of subcutaneous fat had vanished and we looked like skeletons disguised with skin and rags, we could watch our bodies beginning to devour themselves. The organism digested its own protein, and the muscles disappeared. Then the body had no powers of resistance left....

- Compare the average daily ration of ghetto dwellers with USDA recommended daily allowances for adults and children.
- Research some of the ailments ghetto dwellers may have experienced due to severe malnutrition. Discuss the importance of a complete balanced diet.
- Students may keep a food diary of their daily intake for one week, including the calorie count and fat intake for each day.
 - What is the daily requirement of calories and fat for your age? How closely do you meet these requirements?
 - Estimate the caloric intake of ghetto inhabitants.
 - List some symptoms of vitamin deficiencies and malnutrition.

Assessment:

Evaluate students based on completion of their food diary and participation in class discussion.

Resources:

Visit the Food and Nutrition Information Center Web site for nutrition information.

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Ethics, Science, and Genocide

Dr. Josef Mengele

Dr. Josef Mengele was the notorious doctor at Auschwitz. He was often the person who chose who was to be sent to the showers, who was to be sent to work, and who was going to be experimented on. He experimented on all different kinds of people including twins, dwarfs, giants, or anyone else with a unique hereditary trait like a club foot or heterochromia (each eye a different color). Most people were experimented on without their consent. However, some did announce that they had a unique trait; they only did so believing that this would save them. However, nobody knew why Mengele wanted to experiment on them and what his purpose of experimentation because he kept it a secret. Some historians have later concluded that Mengele simply experimented on these people sometimes for no other reason than because he was curious. However, some of these experiments were conducted for military purposes, as well as to fulfill his study in eugenics. Oftentimes life was difficult for Mengele's test subjects and if they survived, they suffered lifelong consequences as a result of the experimentation.

Ideas for discussions

Discuss control subjects

Discuss volunteer subjects vs. non-volunteer subjects and the ethics behind it

Discuss the ethics of experimentation for experimentation's sake

Other Ideas for the classroom

- Engineering (boxcars, planes and how they had to be changed to carry bombs)
- How the resistance had to adapt and improvise engineering
- Compare/Contrast the Tuskegee Experiment