

Name: _____ Class: _____

Dirty Air Can Harm Your Brain and Stress the Body

Studies show pollution can alter brain function in students and disrupt hormones

By Lindsey Konkel
2018

Could the air you're breathing be hurting your brain and body? In this informational text, Lindsey Konkel explores the dangers of air pollution. As you read, take notes on the different ways that air pollution can affect your health.

- [1] The year was 1952. The setting: London, England. *"On December 8, cool air from across the English Channel settled over the Thames River valley and did not move. London's 8 million residents did what they had been doing for centuries: They huddled indoors and warmed themselves by their coal stoves. Smoke ran like tap water from a million chimneys. In the motionless air, the hot vapors chilled and, instead of rising, settled back to the ground. The smoke became so thick that visibility dropped to near zero."*
— Devra Davis, *When Smoke Ran Like Water*, Basic Books 2002.



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That super-thick fog of pollution, 65 years ago, turned the air into a toxic soup that lasted five long days. Local reporters would call it the Great Smog. Inhaling the blackened air sent 150,000 people to the hospital with breathing problems. In all, some 4,000 would die. This disaster provided some of the strongest, early evidence that urban air could prove deadly.

It evolved, owing to an unfortunate combination of bad weather and especially heavy pollution. Yet even today, air pollution sickens and kills people. Lots of people. A 2016 study reported that breathing dirty air is now the fourth-leading cause of deaths worldwide.

Air pollution tends to pose the biggest risk to the very old, to the very young and to people already suffering from some chronic ailments.¹ What types? Asthma (a breathing disorder) and heart disease are two major conditions that put people at risk.

- [5] But scientists are learning that air pollution can pose serious risks to anyone. You don't have to be old or sick. You don't have to suck in horrible fumes or air so full of pollutants that you can see and taste them.

1. persisting illnesses

Indeed, emerging data show that even pollutants too small to see with the naked eye can harm healthy children and teens. That pollution can alter how their brains function. It can make it hard for kids to concentrate. It also can throw out of whack² hormones — chemical messengers that direct the body's activities. In short, it can seriously damage young minds and bodies.

Polluting the brain

Lilian Calderón-Garcidueñas works at the University of Montana in Missoula. As a pathologist, she's a doctor who looks at the body's tissues to diagnose disease. She looks for disease caused by pollutant particles that are small — often way too tiny to see. Scientists call these tiny specks particulates. They come from many sources. Power plants, factories, homes and cars — all spew particulates. So can forest fires.

Once inhaled, these particles can move deep into the lungs. The oxygen you breathe passes from the lungs through a thin membrane.³ From there it enters the blood. Many particulates are small enough to cross that membrane into the blood, too. They're known as nanoparticulates. They can trigger inflammation⁴ wherever they travel. And the blood can carry them everywhere, even to the brain.

Some particulates may enter the brain more directly. If breathed in through the nose, they can contact nerves that bring scent signals to the brain through a structure known as the olfactory bulb. Just as the pollutants' small size allows them to slip into blood through lung membranes, nanoparticles' size lets them enter that bulb's nerve cells. And from there, those inflammatory pollutants can climb into the brain.

[10] Inflammation can be a good thing. The body uses it to kill off damaged cells and harmful germs. But inflammation in the brain is dangerous. It can destroy sensitive cells, causing memory problems.

Digging into the brain

Mexico City, where Calderón-Garcidueñas does her research, is home to nearly 9 million people. Every day, they get around using some 3.5 million cars. And the cars' exhaust pollutes the air. "High-traffic roads are a very important source of particulate [pollution]," notes Calderón-Garcidueñas.

Research has shown that older adults who live in areas with lots of traffic-related air pollution are more likely to suffer Alzheimer's disease than are people at cleaner sites. Alzheimer's causes a type of brain damage that results in memory loss and other problems with thinking, language and behavior.

Alzheimer's symptoms usually show up in old age. Yet researchers believe the disease may start years — even decades — earlier. Calderon-Garcidueñas wants to know just how early. The answer, she says, might one day help researchers prevent some cases of this memory-robbing disease.

2. to cause something not to work properly
3. a small sheet-like structure acting as a boundary or lining in an organism
4. a physical condition in which a part of the body becomes, red, swollen, and painful

Some elderly dogs can develop brain abnormalities seen in people with Alzheimer's disease. Waxy clumps of protein, called plaques (PLAKS), may start to litter their brains. But 15 years ago, Calderon-Garcidueñas reported finding these same plaques in the brains of 11-month-old pups! The dogs had been living outdoors, exposed to Mexico City's heavy air pollution.

- [15] At the time, she told Science News, this is "definitely worrisome." Even more concerning was her finding of the same type of plaques in the brains of seemingly healthy Mexico City children. The plaques hadn't caused symptoms. She was only able to find those plaques because of autopsies done on kids who had died in car crashes or other accidents.

But not all children had them. Those living in distant suburbs, breathing cleaner air, had no brain plaques. Air pollution seemed to explain these brain lesions.⁵

Later, Calderon-Garcidueñas showed that teenagers in Mexico City had more problems with memory and attention than did teens in less-polluted cities. We were picking up these problems with attention and thought-processing "that appeared to be linked to high pollution areas," she said. Her next step was to look at how that might happen. She wondered whether there could be clues in a person's genetic code.

When pollution conspires with our genes

Today, Calderón-Garcidueñas studies how the genes that some people were born with might combine with air pollution to raise their risk of memory problems, including Alzheimer's disease. Her work has focused on a gene called APOE. That's short for apolipoprotein E (AY-poh-lih-poh-PRO-teen E). This gene gives the body instructions for making proteins that help it process the fats in food.

People can be born with any of a few slightly different versions of the gene. Those with the type called APOE 4 have a higher risk of developing Alzheimer's disease. Calderon-Garcidueñas recently studied children and teens with this version of the gene. Some lived in Mexico City; others in cleaner towns. Of the two groups, those in Mexico City were more likely to have developed the telltale brain plaques. Her team described those findings in the October 2016 Environmental Research.

- [20] In a more recent update, Calderon-Garcidueñas' team found further support for pollution's link to Alzheimer's disease. And their latest data are the most disturbing. They viewed the brains of 203 people who had died in Mexico City — from babies (11 months old) to middle-age adults (40 years old). Abnormal proteins that serve as "hallmarks"⁶ of Alzheimer's disease showed up in 99.5 percent of those brains. The researchers conclude that Alzheimer's disease actually can start in early childhood. And the disease had progressed at a faster pace in those people with the APOE 4 gene.

Details of that work appear in the July 2018 Environmental Research.

5. a region in an organ or tissue that has been damaged through injury or disease

6. distinct features of something

“Our findings show that kids need to be protected against air pollution,” says Calderon-Garcidueñas. Most kids can’t control where they live. It might be hard for them to avoid air pollution if they live on a busy road or in a city with lots of cars. That means it’s all the more important to stay away from other substances that can hurt the brain, Calderon-Garcidueñas says. Such things include alcohol, drugs and tobacco. “It’s important to lower the exposures they can control,” she says of kids in polluted communities.

Air pollution is linked to poorer attention

You might not be able to see it or feel it, but air pollution can vary a lot from one day to the next. Such fluctuations could lead to similar day-to-day changes in how a child’s brain functions, says Jordi Sunyer. That’s what his work shows. As an epidemiologist, Sunyer studies the link between pollutants and disease. He coordinates a child health program at the Barcelona Institute for Global Health, ISGlobal. It’s in Barcelona, Spain.

“Attention is critical for school success,” Sunyer points out. It’s the first step in the learning process. Students who are easily distracted will have a harder time focusing on information and remembering it.

[25] “We know there are many factors throughout the day that can cause attention to fluctuate,” Sunyer says. Feeling sleepy can make it harder to stay focused on a task. So can being too hot or too cold. Sunyer had a hunch that air pollution could do this, too.

So his group studied 2,687 children. All were 7 to 10 years old. Each attended one of 39 different Barcelona schools.

Every participant took a computer test four times during the school year. It contained a number of tasks that required paying attention. For instance, one asked kids to watch fish swim in a stream. They were told to click left or right depending on which direction the fish swam. “It’s a simple task, but when kids get bored and lose attention, they start to click the wrong answer,” Sunyer notes.

The researchers also measured levels of air pollution on days that the kids had been tested. Then they compared the kids’ scores when pollution levels in Barcelona had been relatively high or low. And they showed that the kids scored slightly worse on days with higher levels of certain air pollutants. Which types? Nitrogen dioxide and soot (elemental carbon). Both can be spewed by traffic and industrial smokestacks. The researchers shared their results in the March 2017 issue of *Epidemiology*.

Sunyer now is focused on helping schools in Barcelona identify ways to lower levels of the pollution to which kids are exposed.

[30] For instance, schools could create more zones around them where cars and buses aren’t allowed to idle, meaning run their engines while parked. Another idea: Plant more trees and greenery around schools. Plants can help remove pollutants from the air, Sunyer points out. They do this by absorbing gases and small particles through their leaves and roots.

Air pollution can boost stress hormones

Another reason to control air pollution: It can stress out the body.

Imagine you're trapped in a room that's filling with smoke. Your heart is racing. You jump into action. In just seconds, you open the window and climb out the burning building to reach safety. The body's quick reaction to such an emergency is called the fight-or-flight response.

Scary events, such as a fire, aren't the only things that can activate that fight-or-flight response. Air pollution can too, new data show. It does so through hormones.

Hormones are the body's chemical messengers. They control many important activities. Stress hormones help people react quickly to life-threatening situations. When we're faced with a fearful situation, the body ramps up production of certain hormones, such as adrenaline (Ah-DREN-uh-lin). Breathing polluted air can trigger a similar response, researchers in China now report.

[35] Huichu Li works at Fudan University, in Shanghai. He and his colleagues studied 55 students attending college in that city. Air pollution there is some of the worst in the world. The researchers gave all of these students air purifiers to use in their dormitory rooms. Half received working air purifiers. These helped remove particulates from the air. The other half received real air purifiers that appeared to work — but didn't. The researchers had removed a filter. Now the devices could no longer remove pollution particles from the air.

The students used the air purifiers for nine days. Afterward, the researchers collected blood and urine from each student. Those with nonworking air purifiers had higher levels of stress hormones in their blood.

In an emergency, stress hormones and the fight-or-flight response can be helpful. But when the body ups their production too often or for too long, those hormones can harm the heart and blood vessels. Fortunately, the students in this test were healthy. None were sickened by their 9-day exposure.

Still, their bodies were "clearly having harmful reactions to the... air pollution," notes Robert Brook. He's a doctor of internal medicine at the University of Michigan in Ann Arbor. He was not involved in the study. But Brook can understand its impacts. He has been focusing on how air pollution affects the heart.

Brook worries that repeated short-term exposures to air pollution may add up. "Over many years of exposure, these small health effects might lead to more long-term serious health effects". After years of exposure, he says, "That could place healthy young people at risk of developing high blood pressure, diabetes or even heart diseases or strokes."

[40] The Fudan University team published its results last August in the American Heart Association journal *Circulation*. Future studies, its authors say, should look at whether using air purifiers in homes and buildings might, over time, help protect health.

New studies like the one published by the Fudan team show how far we've come in understanding the health effects of air pollution since London's Great Smog. Yet as in many areas of science, "there's still a lot to learn," says Brook. He says one thing is becoming more and more clear: Everyone — even healthy young people — can be harmed by air pollution.

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Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which statement identifies the central idea of the text?
 - A. Children are less likely to be harmed by air pollution when they live in a city.
 - B. Air pollution can cause people to develop mental and physical health problems that could become more serious over time.
 - C. Air pollution is not a concern for children because their bodies and minds are young and strong.
 - D. While air pollution has a serious impact on children and adults' health, there is much people can do to protect themselves against the invisible threat.

2. PART B: Which detail from the text best supports the answer to Part A?
 - A. "Inflammation can be a good thing. The body uses it to kill off damaged cells and harmful germs." (Paragraph 10)
 - B. "Most kids can't control where they live. It might be hard for them to avoid air pollution if they live on a busy road or in a city with lots of cars." (Paragraph 22)
 - C. "Fortunately, the students in this test were healthy. None were sickened by their 9-day exposure." (Paragraph 37)
 - D. "After years of exposure, he says, 'That could place healthy young people at risk of developing high blood pressure, diabetes or even heart diseases or strokes.'" (Paragraph 39)

3. Which of the following describes the author's main purpose in the text?
 - A. to show the various ways that young people can be harmed by air pollution
 - B. to explain why children are more seriously affected by air pollution than adults
 - C. to hold adults responsible for exposing children to dangerous air pollution
 - D. to provide readers with the tools to protect themselves against air pollution

4. How does the author's reference to the Great Smog contribute to the development of ideas in the text (Paragraphs 1-2)?
 - A. It helps readers understand how dangerous and deadly air pollution can be.
 - B. It shows readers that the sick and elderly are largely affected by air pollution.
 - C. It shows how far we have come with making the air we breathe cleaner.
 - D. It emphasizes how uncommon such deadly examples of air pollution are.

5. Which of the following describes the relationship between air pollution and students' ability to learn?
 - A. Air pollution makes it more difficult for students to be able to hold knowledge and remember it later on.
 - B. Air pollution negatively affects students' attention, making it difficult for them to focus.
 - C. Air pollution damages areas in students' brains, preventing them from making important connections.
 - D. Air pollution negatively affects students' hormones, stunting the overall development of their brain.

6. What is the relationship between your genes, the environment you live in, and your overall health?

ANSWER KEY > Dirty Air Can Harm Your Brain and Stress the Body

by Lindsey Konkel 2018

1. **RI.2**

PART A: Which statement identifies the central idea of the text?

- A. Children are less likely to be harmed by air pollution when they live in a city.
- B. Air pollution can cause people to develop mental and physical health problems that could become more serious over time.**
- C. Air pollution is not a concern for children because their bodies and minds are young and strong.
- D. While air pollution has a serious impact on children and adults' health, there is much people can do to protect themselves against the invisible threat.

2. **RI.1**

PART B: Which detail from the text best supports the answer to Part A?

- A. "Inflammation can be a good thing. The body uses it to kill off damaged cells and harmful germs." (Paragraph 10)
- B. "Most kids can't control where they live. It might be hard for them to avoid air pollution if they live on a busy road or in a city with lots of cars." (Paragraph 22)
- C. "Fortunately, the students in this test were healthy. None were sickened by their 9-day exposure." (Paragraph 37)
- D. "After years of exposure, he says, 'That could place healthy young people at risk of developing high blood pressure, diabetes or even heart diseases or strokes.'" (Paragraph 39)**

3. **RI.6**

Which of the following describes the author's main purpose in the text?

- A. to show the various ways that young people can be harmed by air pollution**
- B. to explain why children are more seriously affected by air pollution than adults
- C. to hold adults responsible for exposing children to dangerous air pollution
- D. to provide readers with the tools to protect themselves against air pollution

4. **RI.5**

How does the author's reference to the Great Smog contribute to the development of ideas in the text (Paragraphs 1-2)?

- A. It helps readers understand how dangerous and deadly air pollution can be.
- B. It shows readers that the sick and elderly are largely affected by air pollution.
- C. It shows how far we have come with making the air we breathe cleaner.
- D. It emphasizes how uncommon such deadly examples of air pollution are.

5. **RI.3**

Which of the following describes the relationship between air pollution and students' ability to learn?

- A. Air pollution makes it more difficult for students to be able to hold knowledge and remember it later on.
- B. Air pollution negatively affects students' attention, making it difficult for them to focus.**
- C. Air pollution damages areas in students' brains, preventing them from making important connections.
- D. Air pollution negatively affects students' hormones, stunting the overall development of their brain.

6. **RI.3**

What is the relationship between your genes, the environment you live in, and your overall health?

Answers will vary; students should discuss Calderón-Garcidueñas's exploration of the interaction between people's genes, the air quality of their environment, and the chances that they develop Alzheimer's. It has already been determined that, "... older adults who live in areas with lots of traffic-related air pollution are more likely to suffer Alzheimer's disease than are people at cleaner sites" (Paragraph 12). Students also should discuss Calderón-Garcidueñas's study concerning genes and the likelihood of Alzheimer's by saying, "Those with the type called APOE 4 have a higher risk of developing Alzheimer's disease" (Paragraph 19). Calderón-Garcidueñas found that "those [children] in Mexico City were more likely to have developed the telltale brain plaques" that are seen in older people with Alzheimer's (Paragraph 19). Not only was it more common for children with the APOE 4 living in polluted environments, such as Mexico City, to develop indications of Alzheimer's, but "the disease had progressed at a faster pace in those people with the APOE 4 gene" (Paragraph 20). Calderón-Garcidueñas's studies show how our genes interact with the environment around us, and can result in the likelihood of a disease developing, or in its quick progression.

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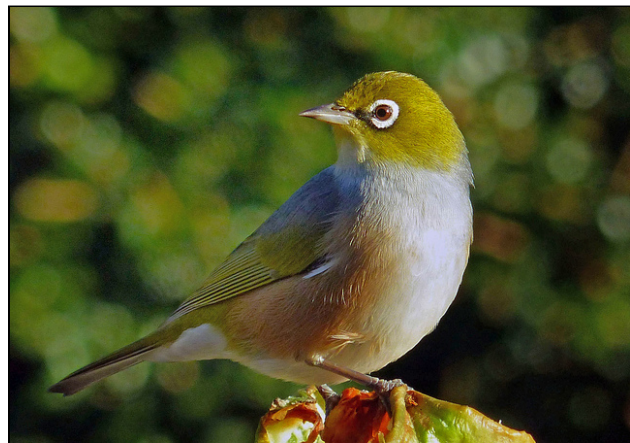
Can DNA Editing Save Endangered Species?

Scientists are considering whether — and when — to use new genetic tools

By Kathiann Kowalski
2018

Scientists have developed a method of editing an organism's DNA, and it might just be the key to saving endangered species. In this informational text, Kathiann Kowalski discusses the genetic editing process, as well as the risks and benefits that it poses to ecosystems. As you read, take notes on why scientists would like to edit the DNA of invasive species.

- [1] Kiwis and other native birds in New Zealand are in trouble. In the 19th century, European traders and immigrants introduced many foreign rats, stoats,¹ and other animals to the South Pacific island nation. Since then, many of these non-native animals — known as invasive species — have been preying on the native birds, some of which don't fly. New Zealand's leaders want to get rid of the invaders. And a new technology could help. But scientists are now questioning whether that is a smart thing to do.



"Waxeye or Silvereye.NZ" by Bernard Spragg. NZ is in the public domain.

Kevin Esvelt is an evolutionary ecologist at the Massachusetts Institute of Technology in Cambridge. An evolutionary ecologist studies the genetics of living things and how species have changed over time. "You need to be very careful," Esvelt says. It's always possible, he notes, that some "solution" might cause problems elsewhere in an ecosystem.

Esvelt is talking with people in New Zealand about a plan. They're considering use of a type of gene-editing tool known as a *gene drive*. It can copy and paste itself into the *genome* of an organism. (A genome is the complete set of genetic instructions in an organism.) Once the gene drive is inside the genome, it could change the genes of some invasive species in a way that would make that species die off at sites where it doesn't belong.

That may sound like a good thing. Indeed, many scientists hope it will be. Still, they have concerns. After all, if a gene drive "escapes," it could kill that targeted species even in places where it does belong.

- [5] Tina Saey of *Science News* magazine has a doctorate degree in molecular genetics. She has covered gene editing and gene drives a lot. In an award-winning feature story in the magazine, she notes: "Researchers have designed ways to keep [gene drives] confined in the lab." However, she adds, "no such safety nets exist for gene drives released into the wild."

1. a type of weasel

Wiping out an entire species, even if it's a pest, raises questions about whether such a move would be the right thing to do. To date, she points out, scientists and policymakers are only just starting to think about this.

How it works

In recent years, a new and very popular tool has been available to tinker with genes. It's known as CRISPR/Cas9. Most people just call it CRISPR. (That's much shorter than using its entire name: "clustered regularly interspaced short palindromic repeats.") The Cas9 part is an enzyme. It's a molecular scissors, of sorts, that cuts DNA.

Scientists inject Cas9 into a cell in which they want to alter DNA. But Cas9 is blind and doesn't know where to make cuts. It needs a buddy, like a guide dog, to show it where to snip. In this case, the guide dog is a small piece of another type of genetic material, called RNA. The guide RNA shows Cas9 where to cut.

Guide RNAs are very picky. They will only take Cas9 to one particular place in the genome. It's similar to a guide dog leading its owner to one particular subway station and to the correct track. Even though there are many subway stations and multiple tracks, only one is the right one.

- [10] Once Cas9 and its guide reach their destination, the scissors snips the DNA. Then, other things can happen. One possibility is that the cell can repair the cut. Sometimes the repair is done by sticking the cut ends back together. That can break the gene. Sometimes the repair fixes a previously broken gene, by using a healthy copy of the gene as a pattern. Scientists have used this RNA-enzyme combo to break and fix genes in many types of animals.

Another possibility is that a piece of DNA that the researchers have injected into the cell (along with Cas9) can be pasted into the cut section. Scientists use this method to insert genes into plants and animals at precise locations.

Gene drives take the CRISPR system a step further.

A gene drive uses an extra piece of DNA to paste into the cut. That extra DNA contains the code to make the CRISPR system again. It's like a combination scissors and copy machine that can make copies of itself.

When an animal or plant carrying a gene drive mates, its eggs or sperm will make the scissors protein and the guide RNA. When the egg or sperm from the organism with the gene drive fuses to an egg or sperm from an unaltered organism, the gene drive goes to work. Cas9 cuts the unaltered DNA in the place where the guide RNA shows it to. Then, the cell repairs the break by putting in a copy of the gene drive. It's that extra copying step that makes a gene drive different from regular CRISPR.

What makes a gene drive special

- [15] Normally a parent has a 50/50 chance of passing any given gene along to its offspring. But gene drives take over any unaltered version of the target gene. So, they can be passed along almost 100 percent of the time. That's why they are called gene drives — because they break the 50/50 genetic speed limit.

Scientists have used gene drives in the lab to alter eye color in fruit flies. They have tinkered with yeast. Two separate groups have made CRISPR gene drives to stop mosquitoes from transmitting malaria. (One group of researchers altered the mosquitoes so that the insects can't carry the malaria parasite. The other group altered genes so that the mosquitoes can no longer reproduce.)

CRISPR gene drives could set the stage to make gene edits in nearly every member of a selected species. How? Scientists add the new gene they want to alter — let's call it a "taming" one — to the targeted species. Then the CRISPR gene drive makes this change whenever it finds a wild (untweaked) version of the gene.

As the genetically "tamed" organisms breed with wild ones, the CRISPR gene drive "cuts the original version and replaces it with the edited one," Esvelt explains. Now, "in the next generation, all the offspring are guaranteed to inherit it. And again. And again. And again." Eventually, practically every organism in a population will be born with the newly inserted taming gene.

Breaking that speed limit

In a small population, that change can take just 12 to 24 generations. For short-lived animals like a rat, that may amount to only several years. If any organisms with the altered gene go elsewhere, they can spread that gene drive into a new population. For instance, Esvelt notes, "Rats are really good stowaways [on ships]." Or people could intentionally move them. Just a handful of altered organisms released into a new population should be able to quickly spread the gene drive through all of them, Esvelt says.

- [20] He even suggests a humane way to kill off a rat population that threatened local bird species: Add a gene that makes the rats infertile. Individual rats wouldn't suffer. But they couldn't have more babies. Over time, the local population would die out. And the rats' threat to the birds would go away.

But even rats have native populations where an ecosystem depends on them. So scientists don't want to kill them off everywhere in the world. Otherwise, that could throw off the ecological balance somewhere else. Esvelt's group has proposed a way to limit that risk.

"We call this a daisy drive, because it involves creating a gene-drive daisy chain," he explains. Just as each flower in a chain of daisies is a separate unit, each part of the "daisy" gene drive would have part of the instructions for CRISPR and the gene drive. And those parts are scattered around in different places in the genome. Because only half of a parent's DNA is passed on to offspring, some of the pieces won't get inherited in the next generation. Without all of the pieces in one organism, the gene drive eventually gets a flat tire and can't drive anymore.

Esvelt has gotten the daisy chain gene drive to work in the lab with tiny worms known as nematodes. The results are "very preliminary,"² he says. However, he believes, it's time to start talking about the idea.

2. something that comes first to prepare for the main part of something else

Do we have the right?

Todd Kuiken is an environmental scientist at North Carolina State University in Raleigh. He and Esvelt talked about gene drives and CRISPR on October 6. They were taking part in the Society of Environmental Journalists' annual meeting in Pittsburgh, Pa. Kuiken agrees that lots of people should think hard and talk about whether and how to couple gene drives and CRISPR.

- [25] "Do we as humans really have the right to do this?" Kuiken asks. That's a big question. What he means is that there's a lot at stake with a version of a gene drive that is designed to spread a change in the environment forever. Even with the daisy chain, he wonders whether humans have the right "to remove one species from one area where we don't want it, or that we don't think is good for it."

Also, he asks, "where do you field-test a gene drive?" After all, the animals people want to change don't stay put. They tend to roam about an ecosystem.

No one has clear answers on what is the right thing to do. Nor is it clear who should have the right to make the final call, Kuiken says. Yet that doesn't mean the technology shouldn't be used at all, he adds. Indeed, he noted, if people wait too long, it may be too late to save an endangered species.

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Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which statement best expresses the central idea of the text?
 - A. DNA editing is necessary to return organisms to their native habitats.
 - B. Scientists lack control over how gene editing will affect a species' behavior.
 - C. DNA editing may save endangered species but poses ethical risks of eliminating others.
 - D. Scientists agree that using DNA editing on animals to save endangered species is ethical.

2. PART B: Which detail from the text best supports the answer to Part A?
 - A. "In the 19th century, European traders and immigrants introduced many foreign rats, stoats, and other animals to the South Pacific island nation." (Paragraph 1)
 - B. "Scientists have used this RNA-enzyme combo to break and fix genes in many types of animals." (Paragraph 10)
 - C. "Without all of the pieces in one organism, the gene drive eventually gets a flat tire and can't drive anymore." (Paragraph 22)
 - D. "Even with the daisy chain, he wonders whether humans have the right 'to remove one species from one area where we don't want it, or that we don't think is good for it.'" (Paragraph 25)

3. How can editing the genes of an invasive species affect the environment it has invaded?
 - A. It can encourage the invasive species to migrate away from an environment.
 - B. It can stop the invasive species from reproducing and overtaking an environment.
 - C. It can introduce genetic diseases in the invasive species that can kill it off immediately.
 - D. It can change the diet of the invasive species so that it no longer targets endangered species.

4. How does paragraph 16 contribute to the development of ideas in the text?
 - A. It states that altering an organism's DNA is unethical.
 - B. It describes the progress of DNA editing over the years.
 - C. It emphasizes that DNA editing should be used to benefit humans.
 - D. It provides examples of how scientists have modified organisms with DNA editing.

5. How does the discussion of rats in paragraphs 19-21 develop the risks associated with DNA editing?

ANSWER KEY > Can DNA Editing Save Endangered Species?

by Kathiann Kowalski 2018

1. **RI.2**

PART A: Which statement best expresses the central idea of the text?

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2. **RI.1**

PART B: Which detail from the text best supports the answer to Part A?

- A. "In the 19th century, European traders and immigrants introduced many foreign rats, stoats, and other animals to the South Pacific island nation." (Paragraph 1)
- B. "Scientists have used this RNA-enzyme combo to break and fix genes in many types of animals." (Paragraph 10)
- C. "Without all of the pieces in one organism, the gene drive eventually gets a flat tire and can't drive anymore." (Paragraph 22)
- D. "Even with the daisy chain, he wonders whether humans have the right 'to remove one species from one area where we don't want it, or that we don't think is good for it.'" (Paragraph 25)**

3. **RI.3**

How can editing the genes of an invasive species affect the environment it has invaded?

- A. It can encourage the invasive species to migrate away from an environment.
- B. It can stop the invasive species from reproducing and overtaking an environment.**
- C. It can introduce genetic diseases in the invasive species that can kill it off immediately.
- D. It can change the diet of the invasive species so that it no longer targets endangered species.

4. **RI.5**

How does paragraph 16 contribute to the development of ideas in the text?

- A. It states that altering an organism's DNA is unethical.
- B. It describes the progress of DNA editing over the years.
- C. It emphasizes that DNA editing should be used to benefit humans.
- D. It provides examples of how scientists have modified organisms with DNA editing.**

5. **RI.5**

How does the discussion of rats in paragraphs 19-21 develop the risks associated with DNA editing?

Answers will vary; students should discuss how the discussion of rats highlights the potential risks involved in containing an altered set of organisms. While scientists may be eager to use DNA editing as a solution to invasive species, one of the potential risks in spreading the altered DNA into a new population. The text uses the example of rats because they are “really good stowaways” and can spread quite quickly (Paragraph 19). While eliminating an invasive species of rats by making them infertile may eliminate the rats’ threat to native species, there is a risk that this altered DNA may spread to ecosystems in which the rats are not only native but important; “even rats have native populations where an ecosystem depends on them” (Paragraph 21). Thus the discussion of rats in paragraphs 19-21 emphasizes the risks of DNA editing when it comes to interfering with the delicate balance of larger ecosystems.

Name: _____ Class: _____

Emmett Till

By Jessica McBirney
2016

Emmett Louis Till (1941-1955) was a fourteen-year-old African American boy from Chicago who was lynched in Mississippi after reportedly flirting with a white woman, Carolyn Bryant. "Lynching" refers to killing someone for an alleged offense with or without a legal trial, and the act is often linked to angry mobs and race. The injustice of his murder inspired many in the Civil Rights Movement. In a book published in 2017, Bryant said she made up her original accusations, sparking further discussion around Till's death and legacy. As you read, note the racial climate of the South in which Emmett Till was killed.

- [1] The murder of Emmett Till is a crime that continues to resonate¹ with people around the world because of its brutality, and the fact that no one has ever been brought to justice for his killing. There have been varied accounts of what provoked his killers to act but, ultimately, the fact remains that the young boy was kidnapped, tortured and murdered for no other reason than the color of his skin.



"Emmett Till Before" by Image Editor is licensed under CC BY 2.0

Emmett Till grew up in a middle-class, predominantly black neighborhood in Chicago, raised by his mother, Mamie Till. His great uncle Mose Wright traveled up from Mississippi to Chicago, in the summer of 1955, to visit Emmett and his mother. When Wright returned to the south, Emmett begged his mother to let him tag along, to visit the rest of the family. She relented,² but sent him with a warning: Mississippi is very different from Chicago – make sure to behave yourself around the white people down there. Emmett agreed he would. He was 14 years old.

Flirting with Danger

He arrived in his uncle's hometown, Money, Mississippi, in late August. On the evening of August 24th, Emmett and several cousins stopped into a local store to buy candy, where they encountered a young white woman named Carolyn Bryant. She and her husband, Roy Bryant, owned the store. Earlier in the week, Emmett had bragged to his cousins about the white girls he'd dated at school in Chicago, so they dared him to say something to Carolyn as she sat behind the counter.

1. **Resonate (verb):** to create strong feelings or memories
2. **Relent (verb):** to agree to do or accept something after resisting or refusing

Emmett entered the store alone. Accounts have varied as to what Emmett did or said to her. For a long time, it was believed that he may have wolf-whistled, touched her hand, or asked her on a date. However, in an interview from 2007, Carolyn Bryant said “nothing that boy did could ever justify what happened to him,” and she confessed that she made up her claims that he had made a physical advance on her.³ Carolyn said that she did not remember what else happened that night, but it is known that she responded to Emmett Till by running outside to retrieve a pistol from her car. When the boys saw the gun, they ran away from the store to avoid more trouble.

The Murder

- [5] Roy Bryant heard about the incident a few days later and began questioning black men around town to find out who had done it. He eventually traced it back to Emmett. Bryant and a friend, J. W. Milam, broke into Mose Wright’s house in the early morning hours of August 28, 1955, and demanded to know who had “harassed” his wife. They threatened to shoot Emmett, told him to get dressed, and led him outside to their pickup truck.

Bryant, Milam and several other men — both black and white — drove out of town, stopping twice to beat Emmett severely. Later that morning, Emmett’s Uncle Mose called the authorities and reported Bryant and Milam for kidnapping. They were arrested shortly thereafter, and Emmett was presumed still missing.

Three days after the abduction,⁴ a fisherman discovered Emmett’s body in the water of the Tallahatchie River. The corpse was so disfigured⁵ from the beatings and from being in the water so long that the only way it could be identified was by a ring on Emmett’s finger, bearing his initials.

The Funeral

When Mamie Till found out about the murder, she insisted that the body be sent back to Chicago immediately, whatever the cost. When she saw Emmett’s mutilated⁶ face and body, she also insisted they hold an open-casket funeral, so everyone could see the worst effects of racism in the U.S.

Tens of thousands of people came to see Emmett and show their support for his mother. Newspapers across the country carried the story.

The Trial

- [10] Bryant and Milam stood trial for Emmett’s murder in late September, 1955. Lawyers for the defense argued that the body was too disfigured to be properly identified, and they claimed Emmett was probably still alive and simply had not turned up yet. Mose Wright testified against his nephew’s murderers, the first black man to testify against white men in the state of Mississippi.

3. Carolyn Bryant made this confession to author Timothy Tyson during a 2007 interview, and it was published in his book, *The Blood of Emmett Till*, in 2017.

4. the act of kidnapping someone

5. damaged in appearance

6. cut or injured severely, with lasting damage

The jury was made up of entirely white men. After listening to the facts of the case for five days, they deliberated⁷ for just 67 minutes before concluding that Bryant and Milam were not guilty. One juror said in an interview, “If we hadn’t stopped to drink pop,⁸ it wouldn’t have taken that long.”

Just one year later, in 1956, Bryant and Milam sold their story to *Look* magazine. In the interview they gave their account of the murder for the very first time (they did not speak during their trial). Because they were found not guilty, they could not be tried again in a court of law for the murder. They admitted to everything, including shooting him to death, and filled in many details from the story. According to their account in the interview, their original intent was to beat him up and leave him on a riverbank, just to teach him a lesson. But as they continued to beat him, Emmett called them names and insisted he was just as good as they were. Presumably out of anger, they drove to the edge of the Tallahatchie, shot Emmett in the head, tied a weight around his neck with barbed wire, and threw his body into the water.

Milam explained why he felt he had to kill Emmet: “‘Chicago boy,’ I said, ‘I’m tired of ‘em sending your kind down here to stir up trouble. I’m going to make an example of you – just so everybody can know how me and my folks stand.’” Throughout the interview, the two men never showed any sign of guilt or wrongdoing; in their minds they had done what was right to protect their families and their country – they were heroes. Mamie Till later confirmed that “they never regretted what they had done.... He said he would do the same thing over again, to whoever got in his way. I felt sorry for him.”

A Symbol for Civil Rights

Reactions to the feature in *Look* shed light on the complex race issues facing the country in the 1950s. Letters to the editor flooded in, some congratulating the interviewer’s bravery. One preacher from Ohio wrote, “You are to be complimented for your willingness to stick your neck out in this manner for the sake of justice.”

- [15] But others condemned the piece: “By this example of opinionated, baseless reporting, *Look* itself pays scant recognition to the traditions of American Justice it claims were ignored,” said one Mississippi reporter. Another writer defended Bryant and Milam, saying, “[They] did what had to be done, and their courage... is to be commended.⁹ To have followed any other course would have been unrealistic [and] cowardly.” Reactions like these across the South prompted people to understand the need for greater equality between blacks and whites.

Emmett Till’s murder became one of the most important catalysts¹⁰ of the Civil Rights movement in the 1960s. When Rosa Parks famously refused to give up her seat on a bus in Montgomery, Alabama, in December of 1955, she said later she had been thinking of Emmett and the injustice he experienced. Her action sparked the year-long Montgomery Bus Boycott, which brought the Civil Rights movement to the national stage.

7. **Deliberate (verb):** to think about or discuss issues and decisions carefully
8. soda
9. **Commend (verb):** to praise
10. **Catalyst (noun):** something that initiates or speeds up a change or action

Two years later, Congress passed the Civil Rights Act of 1957, which set up protections for black voters and established the Civil Rights Division in the Justice Department; federal officials could now get directly involved in cases where civil rights were being abridged. Later, the Civil Rights Act of 1964 ended all forms of segregation¹¹ in public places and banned employment discrimination.

Mamie Till, who passed away in 2003, understood the significance of Emmett's death. She herself became actively involved in empowering black youth in Chicago. But the pain of her son's murder never left her completely. "This is what really started the civil rights movement, that's what everyone tells me. But I was not trying to start anything. I was just upset that my only child was gone, and so needlessly."

Emmett Till was brutally murdered because of who he was. There is nothing that can explain or justify what happened to him. Even more disturbingly, there have been thousands of other African Americans who were also lynched, and many of their names have been erased from history. Because of the circumstances surrounding his death and Mamie Till's refusal to let his death be in vain,¹² his story has become one of the most well-known.

"Emmett Till" by Jessica McBirney. Copyright © 2016 by CommonLit, Inc. This text is licensed under CC BY-NC-SA 2.0.

11. referring to the separation different races, classes, or ethnic groups, namely the separation of white people and black people in the U.S.
12. without success or a result

Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which TWO statements best describe the central ideas of the article?
 - A. Emmett Till was an innocent boy who was hurt because he was in the wrong place at the wrong time.
 - B. Emmett Till's murder prompted Mississippi to move its justice system to be fairer towards all.
 - C. The national attention received by Emmett Till's murder embarrassed many Southerners into fighting for racial equality.
 - D. Emmett Till was an ordinary boy who became the victim of some Southerners' hate and fear.
 - E. Emmett Till's death turned him into a symbol of America's racial injustice, inspiring many to promote equality for all.
 - F. Emmett Till's death revealed that all Southerners thought he deserved to die for daring to flirt with a white woman.

2. PART B: Which TWO of the following phrases from the text best support the answer to Part A?
 - A. "Earlier in the week Emmett had bragged to his cousins about the white girls he'd dated at school in Chicago, so they dared him to say something to Carolyn as she sat behind the counter." (Paragraph 3)
 - B. "'Chicago boy,' I said, 'I'm tired of 'em sending your kind down here to stir up trouble. I'm going to make an example of you – just so everybody can know how me and my folks stand.'" (Paragraph 13)
 - C. "Mamie Till later confirmed that 'they never regretted what they had done.... He said he would do the same thing over again, to whoever got in his way. I felt sorry for him.'" (Paragraph 13)
 - D. "Emmett Till's murder became one of the most important catalysts of the Civil Rights movement in the 1960s." (Paragraph 16)
 - E. "Later, the Civil Rights Act of 1964 ended all forms of segregation in public places and banned employment discrimination." (Paragraph 17)
 - F. "'But I was not trying to start anything. I was just upset that my only child was gone, and so needlessly.'" (Paragraph 18)

3. Which statement best describes how Mamie Till was affected by her son's death?
 - A. Mamie Till was embarrassed her son was murdered and withdrew from public view.
 - B. Mamie Till felt that she needed to share what happened to her son to show how bad racism was in the South.
 - C. Mamie Till was inspired to fight for the passage of the Civil Rights Act of 1957.
 - D. Mamie Till was celebrated after she forgave the killers of her son during an interview with Look Magazine.

4. How does the following sentence from paragraph 13 contribute to the author's portrayal of Southern beliefs about race at the time of the murder: "Throughout the interview, the two men never showed any sign of guilt or wrongdoing; in their minds they had done what was right to protect their families and their country – they were heroes."
- A. A belief existed in some segregated Southern communities that black men who asserted their equality were dangerous to individuals and the social order.
 - B. In the South, everyone believed that all African Americans were dangerous to the community and deserved to be monitored and put in their place.
 - C. Southern white men were threatened by their wives' attraction to African American men and retaliated with aggressive behavior towards black men.
 - D. Defending the home and family is a Southern tradition that prevents people from feeling remorse for hurting others.

5. How does background on Emmett Till's life help us understand the impact of his murder?

Discussion Questions

Directions: Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.

1. Emmett Till's murder was one of many causes for social unrest and the Civil Rights Movement. Can you think of similar catalysts for social movements then or now? What do these events have in common?
2. In the context of this article, what are the effects of prejudice? Cite evidence from the article, your personal experience, and other literature, art, and history in your answer.
3. Do you believe that Carolyn Bryant was afraid of Emmett Till? What do you think motivated her and her husband to act the way that they did? How did fear drive their actions, and what could they be said to be so afraid of?

ANSWER KEY > Emmett Till

by Jessica McBirney 2016

1. **RI.2**

PART A: Which TWO statements best describe the central ideas of the article?

A. Emmett Till was an innocent boy who was hurt because he was in the wrong place at the wrong time.

B. Emmett Till's murder prompted Mississippi to move its justice system to be fairer towards all.

C. The national attention received by Emmett Till's murder embarrassed many Southerners into fighting for racial equality.

D. Emmett Till was an ordinary boy who became the victim of some Southerners' hate and fear.

E. Emmett Till's death turned him into a symbol of America's racial injustice, inspiring many to promote equality for all.

F. Emmett Till's death revealed that all Southerners thought he deserved to die for daring to flirt with a white woman.

2. **RI.1**

PART B: Which TWO of the following phrases from the text best support the answer to Part A?

A. "Earlier in the week Emmett had bragged to his cousins about the white girls he'd dated at school in Chicago, so they dared him to say something to Carolyn as she sat behind the counter." (Paragraph 3)

B. "‘Chicago boy,’ I said, ‘I’m tired of ‘em sending your kind down here to stir up trouble. I’m going to make an example of you – just so everybody can know how me and my folks stand.’" (Paragraph 13)

C. "Mamie Till later confirmed that 'they never regretted what they had done.... He said he would do the same thing over again, to whoever got in his way. I felt sorry for him.'" (Paragraph 13)

D. "Emmett Till's murder became one of the most important catalysts of the Civil Rights movement in the 1960s." (Paragraph 16)

E. "Later, the Civil Rights Act of 1964 ended all forms of segregation in public places and banned employment discrimination." (Paragraph 17)

F. "‘But I was not trying to start anything. I was just upset that my only child was gone, and so needlessly.'" (Paragraph 18)

3. **RI.3**

Which statement best describes how Mamie Till was affected by her son's death?

A. Mamie Till was embarrassed her son was murdered and withdrew from public view.

B. Mamie Till felt that she needed to share what happened to her son to show how bad racism was in the South.

C. Mamie Till was inspired to fight for the passage of the Civil Rights Act of 1957.

D. Mamie Till was celebrated after she forgave the killers of her son during an interview with Look Magazine.

4. **RI.5**

How does the following sentence from paragraph 13 contribute to the author's portrayal of Southern beliefs about race at the time of the murder: "Throughout the interview, the two men never showed any sign of guilt or wrongdoing; in their minds they had done what was right to protect their families and their country – they were heroes."

A. A belief existed in some segregated Southern communities that black men who asserted their equality were dangerous to individuals and the social order.

B. In the South, everyone believed that all African Americans were dangerous to the community and deserved to be monitored and put in their place.

C. Southern white men were threatened by their wives' attraction to African American men and retaliated with aggressive behavior towards black men.

D. Defending the home and family is a Southern tradition that prevents people from feeling remorse for hurting others.

5. **RI.3**

How does background on Emmett Till's life help us understand the impact of his murder?

Answers will vary; students should discuss Emmett's background as a black boy from a middle class family and a Northern city. As a boy from Chicago, he grew up with a confidence and belief in his equality to white people that he was not shy about discussing in the South. As such, he was not nervous around white people, and he even told his attackers that he believed they were all equal. His upbringing prevented him from acting within the confines of how white Southerners wanted black Southerners to act, helping his murderer single him out as a sign of unwanted racial progress. Furthermore, Emmett's physical description shows that despite being a child, he was treated like a man, meaning his confidence was all the more threatening to a full-grown white Southern man. On top of all the hallmarks of Emmett being a fine and innocent young man, his mother helped bring his murder to national attention by flying him home despite the cost to a Northern funeral that could be attended by thousands. Overall, while lynchings were common in the South, the fact that Emmett was a young innocent boy from a Northern family helped bring his murder and its injustice to the national stage, prompting civil rights activists to be inspired to fight for equality.

Name: _____ Class: _____

Female WWII Pilots: The Original Fly Girls

By Susan Stamberg
2010

The following article is a production of National Public Radio (NPR), written by Susan Stamberg. During WWII, a shortage of male pilots in the United States led to the formation of a group called WASP — the Women Airforce Service Pilots. Stamberg reports on this relatively little-known group, and its struggle for national and military recognition. As you read, take notes on the challenges these women faced as pilots and after their time in the program.

- [1] In 1942, the United States was faced with a severe¹ shortage of pilots, and leaders gambled on an experimental program to help fill the void: train women to fly military aircraft so male pilots could be released for combat duty overseas.

The group of female pilots was called the Women Airforce Service Pilots — WASP for short. In 1944, during the graduation ceremony for the last WASP training class, the commanding general of the U.S. Army Air Forces, Henry “Hap” Arnold, said that when the program started, he wasn’t sure “whether a slip of a girl could fight the controls of a B-17 in heavy weather.”

“Now in 1944, it is on the record that women can fly as well as men,” Arnold said.

A few more than 1,100 young women, all civilian² volunteers, flew almost every type of military aircraft — including the B-26 and B-29 bombers³ — as part of the WASP program. They ferried new planes long distances from factories to military bases and departure points across the country. They tested newly overhauled planes. And they towed targets to give ground and air gunners training shooting — with live ammunition. The WASP expected to become part of the military during their service. Instead, the program was canceled after just two years.

- [5] They weren’t granted military status until the 1970s. And now, 65 years after their service, they will receive the highest civilian honor given by the U.S. Congress. Last July, President Obama signed a bill awarding the WASP the Congressional Gold Medal. The ceremony will take place on Wednesday on Capitol Hill.



*“Group of Women Airforce Service Pilots and B-17 Flying Fortress”
by U.S. Air Force is in the public domain.*

1. **Severe (adjective):** very great or intense; harsh or strict
2. describing someone not in the military or police force
3. A bomber is a combat aircraft designed to attack ground and sea targets by dropping air-to-ground weaponry, firing torpedoes or deploying air-launched cruise missiles.

Women with Moxie

Margaret Phelan Taylor grew up on a farm in Iowa. She was 19, had just completed two years of college and was ready for adventure in 1943 when a *Life* magazine cover story on the female pilots caught her eye. Her brother was training to be a pilot with the Army. Why not her? She asked her father to lend her money for a pilot's license — \$500, a huge amount then.

"I told him I had to do it," Taylor says. "And so he let me have the money. I don't think I ever did pay it back to him either."

But there was a problem. She was half an inch shorter than the 5-foot-2-inch requirement.

"I just stood on my tiptoes," she says. When she arrived at Avenger Field in Sweetwater, Texas, where most of the WASP were trained, "Well, there were a lot of other short ones just like me, and we laughed about how we got in."

- [10] Short, tall, slim, wide, they all came in knowing how to fly. The military trained male pilots from scratch, but not the female civilian volunteers.

"They didn't want to bring in a bunch of girls who didn't know how to fly an airplane," says Katherine Sharp Landdeck, associate professor of history at Texas Woman's University, who's writing a book about the WASP, tentatively⁴ called *Against Prevailing Winds: The Women Airforce Service Pilots and American Society*. "So you have women who are getting out of high school and taking every dime they had to learn how to fly so they could be a WASP."

A Dangerous Job

Once when Taylor was ferrying an aircraft cross-country, somewhere between Arizona and California, she saw smoke in the cockpit. Taylor was trained to bail out if anything went wrong. "But the parachutes were way too big. They weren't fitted to us," she says. "The force of that air and that speed and everything, why that just rips stuff off you. You'd slip right out."

So her plane was smoking and Taylor faced a defining moment.

"I thought, 'You know what? I'm not going until I see flame. When I see actual fire, why, then I'll jump.'"

- [15] Was she scared? "No. I was never scared. My husband used to say, 'It's pretty hard to scare you.'"

The plane's problem turned out to be a burned-out instrument.

But 38 female pilots did lose their lives serving their country. One was 26-year-old Mabel Rawlinson from Kalamazoo, Mich.

"I've always known of her as the family hero," says Rawlinson's niece, Pam Pohly, who never knew her aunt. "The one we lost too soon, the one that everyone loved and wished were still around."

4. **Tentative** (*adjective*): without confidence or certainty

Rawlinson was stationed at Camp Davis in North Carolina. She was coming back from a night training exercise with her male instructor when the plane crashed. Marion Hanrahan, also a WASP at Camp Davis, wrote an eyewitness account:

I knew Mabel very well. We were both scheduled to check out on night flight in the A-24. My time preceded⁵ hers, but she offered to go first because I hadn't had dinner yet. We were in the dining room and heard the siren that indicated a crash. We ran out onto the field. We saw the front of her plane engulfed in fire, and we could hear Mabel screaming. It was a nightmare.

- [20] It's believed that Rawlinson's hatch malfunctioned, and she couldn't get out. The other pilot was thrown from the plane and suffered serious injuries. Because Rawlinson was a civilian, the military was not required to pay for her funeral or pay for her remains to be sent home. So — and this is a common story — her fellow pilots pitched in.

"They collected enough money to ship her remains home by train," says Pohly. "And a couple of her fellow WASP accompanied her casket."

And, because Rawlinson wasn't considered military, the American flag could not be draped over her coffin. Her family did it anyway.

The Program Is Pulled

The head of the WASP program was Jacqueline Cochran, a pioneering aviator. (After the war, she became the first woman to break the sound barrier.)⁶ Cochran's goal was to train thousands of women to fly for the Army, not just a few dozen integrated⁷ into the men's program. She wanted a separate women's organization and believed militarization would follow if the program was a success. And it was. The women's safety records were comparable and sometimes even better than their male counterparts doing the same jobs.

But in 1944, historian Landdeck says, the program came under threat. "It was a very controversial time for women flying aircraft. There was a debate about whether they were needed any longer," Landdeck says.

- [25] By the summer of 1944, the war seemed to be ending. Flight training programs were closing down, which meant that male civilian instructors were losing their jobs. Fearing the draft⁸ and being put into the ground Army, they lobbied for the women's jobs.

"It was unacceptable to have women replacing men. They could release men for duty — that was patriotic — but they couldn't replace men," Landdeck says.

5. **Precede (verb):** to come before

6. "Breaking the sound barrier" refers to the point at which a vehicle or aircraft goes beyond the speed at which sound travels.

7. **Integrate (verb):** to make part of a larger unit or group

8. "The draft" refers to military conscription, in which people are made to enlist into military service instead of volunteer.

And so, Arnold announced the program would disband by December 1944, but those who were still in training could finish. The Lost Last Class, as it was dubbed, graduated, but served only 2 ½ weeks before being sent home on Dec. 20, along with all the other WASP.

Lillian Yonally served her country for more than a year as a WASP. When she was dismissed from her base in California, there was no ceremony. “Not a darn thing. It was told to us that we would be leaving the base. And we hopped airplanes to get back home.” Home for Yonally was across the country in Massachusetts.

That was a familiar story, but Landdeck says there were some bases that did throw parties or had full reviews for their departing WASP.

Riling The WASP’s Nest

[30] The women went on with their lives.

A few of them got piloting jobs after the war, but not with any of the major airlines. And some of them stayed in the air as airline stewardesses. In those days, no major commercial airline would hire these experienced women as pilots. Like many World War II veterans, most WASP never talked about their experiences.

And according to Taylor, they never expected anything either.

“We were children of the Depression.⁹ It was root hog or die. You had to take care of yourself. Nobody owed us anything,” she says.

The WASP kept in touch for a while. They even formed a reunion group after the war. But that didn’t last long. Then, in the 1960s, they began to find each other again. They had reunions. They started talking about pushing for military status. And then something happened in 1976 that riled the whole WASP’s nest.

[35] “The Air Force comes out and says that they are going to admit women to their flying program,” Landdeck says. An Air Force statement says “it’s the first time that the Air Force has allowed women to fly their aircraft.”

Thirty years later, that comment still upsets former WASP Yonally.

“It was impossible for anybody to say that. That wasn’t true. We were the first ones,” Yonally says.

The fact that the WASP were forgotten by their own Air Force united the women. They lobbied Congress to be militarized. And they persuaded Sen. Barry Goldwater to help. He ferried planes during the war, just as the WASP did. And then, in 1977, the WASP were finally granted military status.

9. The Great Depression (1929-39) was the longest-lasting economic downturn in the 20th century in the Western world.

Over the years it has been reported that the WASP records were sealed, stamped classified and unavailable to historians who wrote histories about WWII. According to archivists at the National Archives, military records containing reports about the WASP were treated no differently from other records from the war, which generally meant the WASP records weren't open to researchers for 30 years. But unlike other stories from the war, the WASP story was rarely told or reported until the 1970s.

[40] "It's hard to understand that they would be forgotten and difficult to believe that they would be left out of those histories. But even they forgot themselves for a while," Landdeck says.

In 1992, to preserve their history, the WASP designated Texas Woman's University in Denton as their official archives.

Yonally is proud to be honored with the Congressional Gold Medal, 65 years after her service, but she's sad that fewer than 300 of her 1,100 fellow WASP are alive to receive it.

"I'm sorry that so many girls have passed on. It's nice the families will receive it, but it doesn't make up for the gals who knew what they did and weren't honored that way," Yonally says.

Taylor is also excited about the medal. She served her country out of loyalty, she says. That was certainly part of it. But the other reason? "I did it for the fun. I was a young girl and everybody had left and it was wartime. You didn't want to get stuck in a hole in Iowa; you wanted to see what was going on."

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Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. Summarize the central ideas of the text in no more than two sentences.

2. Which statement best explains why women were needed as pilots during WWII?
- A. There was a shortage of male pilots in the United States, so women were trained to fill those positions.
 - B. Women replaced the shortage of male pilots, allowing the male pilots to enter combat.
 - C. The burden of WWII finally convinced the U.S. to accept female pilots into the military.
 - D. A larger production of planes needed a greater increase of trained pilots to fly them, so women were called to fill these roles.
3. PART A: What does the phrase “root, hog, or die” mean as used in paragraph 33?
- A. It is a term expressing self-reliance.
 - B. It is a term expressing persistence.
 - C. It is a term expressing eventual failure.
 - D. It is a term expressing surprise.
4. PART B: Which of the following phrases best supports the answer to Part A?
- A. "never expected anything"
 - B. "children of the Depression"
 - C. "you had to take care of yourself"
 - D. "nobody owed us"
5. Which of the following statements best summarizes the purpose of this article?
- A. To notify readers about an upcoming event that will honor the WASP women
 - B. To spread awareness about a forgotten or little known part of women's history
 - C. To explore double standards or discrimination against women in the military
 - D. To encourage today's military leaders to enlist more women in the air force

Discussion Questions

Directions: *Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.*

1. What is the historical relationship between women and the military, at least in the United States? Consider reasons why women weren't allowed to serve and/or the circumstances which allowed them to contribute or fight in conflicts. Cite evidence from this text, your own experience, and other literature, art, or history in your answer.
2. Is it more acceptable for women to serve in the military today? Why or why not?
3. Why do you think was it acceptable for women to serve for men as pilots, but not to replace them?
4. How do we define the roles of men and women? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.
5. In the context of this article, what makes a hero? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.
6. In the context of this article, how are communities formed? What brought the female pilots together and what kept them together? How did their community help them receive recognition? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.

ANSWER KEY > Female WWII Pilots: The Original Fly Girls

by Susan Stamberg 2010

1. **RI.2**

Summarize the central ideas of the text in no more than two sentences.

- a. **Answers will vary; students should mention the purpose of the program, the effectiveness and courage of the women, and the delay in acknowledgment of their services due to their gender.**

2. **RI.3**

Which statement best explains why women were needed as pilots during WWII?

- a. There was a shortage of male pilots in the United States, so women were trained to fill those positions.
- b. **Women replaced the shortage of male pilots, allowing the male pilots to enter combat.**
- c. The burden of WWII finally convinced the U.S. to accept female pilots into the military.
- d. A larger production of planes needed a greater increase of trained pilots to fly them, so women were called to fill these roles.

3. **RI.4**

PART A: What does the phrase “root, hog, or die” mean as used in paragraph 33?

- a. **It is a term expressing self-reliance.**
- b. It is a term expressing persistence.
- c. It is a term expressing eventual failure.
- d. It is a term expressing surprise.

4. **RI.1**

PART B: Which of the following phrases best supports the answer to Part A?

- a. "never expected anything"
- b. "children of the Depression"
- c. **"you had to take care of yourself"**
- d. "nobody owed us"

5. **RI.6**

Which of the following statements best summarizes the purpose of this article?

- a. To notify readers about an upcoming event that will honor the WASP women
- b. **To spread awareness about a forgotten or little known part of women’s history**
- c. To explore double standards or discrimination against women in the military
- d. To encourage today’s military leaders to enlist more women in the air force

Name: _____ Class: _____

Who Was Anne Frank?

By The United States Holocaust Memorial Museum
2016

The Holocaust was one of the greatest human tragedies the world has ever known. Approximately 11 million people were killed by Adolf Hitler and his German Nazi Party, and about 6 million of these victims were European Jews. Anne Frank was a Jewish teenage girl who hid from the German police with her family. Although she did not survive the war, millions of people have since read the diary she kept when she was in hiding. As you read, take notes on how Anne Frank's life and the lives of her family members were changed by persecution.

Overview and Background

- [1] Anne Frank was one of over one million Jewish children who died in the Holocaust. She was born Annelies Marie Frank on June 12, 1929, in Frankfurt, Germany, to Otto and Edith Frank.

For the first 5 years of her life, Anne lived with her parents and older sister, Margot, in an apartment on the outskirts of Frankfurt. After the Nazi¹ seizure of power in 1933, Otto Frank fled to Amsterdam in the Netherlands, where he had business connections. The rest of the Frank family followed Otto, with Anne being the last of the family to arrive in February 1934 after staying with her grandparents in Aachen.²

The Germans occupied³ Amsterdam in May 1940. In July 1942, German authorities and their Dutch collaborators began to concentrate⁴ Jews from throughout the Netherlands at Westerbork, a transit camp near the Dutch town of Assen, not far from the German border. From Westerbork, German officials deported the Jews to Auschwitz-Birkenau and Sobibor killing centers in German-occupied Poland.



*"Anne Frank in 1940, while at 6. Montessorischool, Niersstraat"
by Unknown is in the public domain.*

1. A Nazi was a member of the German political party led by Adolf Hitler. The Nazi party controlled Germany from 1941 to 1945. They were also responsible for the Holocaust, the targeting and mass murdering of over 6 Million European Jews.
2. Aachen is the westernmost city of Germany, near the borders with Belgium and the Netherlands.
3. Here, "occupied" means to take over a place through military invasion.
4. **Concentrate (verb):** gather a larger number of people or things together

In Hiding

During the first half of July, Anne and her family went into hiding in an apartment, which would eventually hide four Dutch Jews as well—Hermann, Auguste, and Peter van Pels, and Fritz Pfeffer. For two years, they lived in a secret attic apartment behind the office of the family-owned business at 263 Prinsengracht Street, which Anne referred to in her diary as the Secret Annex. Otto Frank's friends and colleagues, Johannes Kleiman, Victor Kugler, Jan Gies, and Miep Gies, had previously helped to prepare the hiding place and smuggled food and clothing to the Franks at great risk to their own lives. On August 4, 1944, the Gestapo (German Secret State Police) discovered the hiding place after being tipped off by an anonymous Dutch caller.

Arrest and Deportation

- [5] That same day, Gestapo official SS⁵ Sergeant Karl Silberbauer and two Dutch police collaborators arrested the Franks; the Gestapo sent them to Westerbork on August 8. One month later, in September 1944, SS and police authorities placed the Franks, and the four others hiding with the Franks, on a train transport from Westerbork to Auschwitz, a concentration camp complex in German-occupied Poland. Selected for labor due to their youth, Anne and her sister, Margot, were transferred to the Bergen-Belsen concentration camp near Celle, in northern Germany in late October 1944.

Both sisters died of typhus⁶ in March 1945, just a few weeks before British troops liberated⁷ Bergen-Belsen on April 15, 1945. SS officials also selected Anne's parents for labor. Anne's mother, Edith, died in Auschwitz in early January 1945. Only Anne's father, Otto, survived the war. Soviet forces liberated Otto at Auschwitz on January 27, 1945.

What was Anne Frank's Tattoo ID Number?

On September 3, 1944, Anne, along with her mother, Edith, her sister, Margot, and her father, Otto, boarded the last transport from Westerbork to Auschwitz-Birkenau. The transport arrived in Auschwitz on September 5, 1944 with 1,019 Jews on board. Men and women were separated. The women selected from this transport, including Anne, Edith, and Margot, were marked with numbers between A-25060 and A-25271. Records indicating their exact numbers have not been preserved. Approximately eight weeks later, in late October 1944, Anne and Margot were transferred from Auschwitz-Birkenau to Bergen-Belsen, where they both died sometime in March 1945. Though Anne's death certificate documents her movement between camps, it, too, does not include her tattoo ID number.

Diary

While in hiding, Anne kept a diary in which she recorded her fears, hopes, and experiences. Found in the secret apartment after the family was arrested, the diary was kept for Anne by Miep Gies, one of the people who had helped hide the Franks. It was published after the war in many languages and is used in thousands of middle school and high school curricula in Europe and the Americas. Anne Frank has become a symbol for the lost promise of the children who died in the Holocaust.

5. The SS, also known as the Schutzstaffel, was an organization that operated under Adolf Hitler and the Nazi party.
6. Typhus is a disease transmitted by small insects to the bodies of people and animals, causing high fever, headache and a rash.
7. **Liberate** (*verb*): to free or to be freed

"Who Was Anne Frank?" from [The Holocaust Encyclopedia](#), © 2016, The United States Holocaust Memorial Museum. Reprinted with permission, all rights reserved.

Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which phrase best identifies the central idea of this text?
 - A. Without the help of family, Anne Frank did not have any chance of surviving the Holocaust.
 - B. Anne Frank was one of many victims of the Holocaust, but her story lives on because of her diary and the people that helped to preserve her story.
 - C. We know about the horrors of the Holocaust because Jewish children like Anne Frank wrote about their experiences.
 - D. Anne Frank displayed tremendous optimism in the face of danger and she was a great inspiration to Miep Gies.

2. PART B: Which quote from the text best supports the answer to Part A?
 - A. "The rest of the Frank family followed Otto, with Anne being the last of the family to arrive" (Paragraph 2)
 - B. "Miep Gies, had previously helped to prepare the hiding place and smuggled food and clothing to the Franks" (Paragraph 4)
 - C. "Anne Frank has become a symbol for the lost promise of the children who died in the Holocaust." (Paragraph 8)
 - D. "While in hiding, Anne kept a diary in which she recorded her fears, hopes, and experiences." (Paragraph 8)

3. PART A: What does the phrase "transit camp" most closely mean as it is used in paragraph 3?
 - A. a location where Jews could reunite with their family members
 - B. a place where Jews hid until the Holocaust was over
 - C. a final destination Jews were sent to after being arrested
 - D. a waiting area for Jews before they were moved to a different area

4. PART B: Which selection from the text best supports the answer to Part A?
 - A. "From Westerbork, German officials deported the Jews" (Paragraph 3)
 - B. "Auschwitz-Birkenau and Sobibor killing centers" (Paragraph 3)
 - C. "German authorities and their Dutch collaborators began to concentrate Jews" (Paragraph 3)
 - D. "Anne and her family went into hiding" (Paragraph 4)

5. In the final paragraph, Anne Frank is referred to as “a symbol for the lost promise of the children who died in the Holocaust.” What does this mean and how does it contribute to the development of ideas in the text? Cite evidence from the text to support your answer.

Discussion Questions

Directions: *Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.*

1. The article reveals that Anne Frank and her family “were marked with numbers,” what is the significance of this detail (Paragraph 7)?

2. In your opinion, why is it important for individuals to keep first hand accounts of history, such as Anne Frank’s diary?

3. In the context of the article, how are we changed by war? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.

ANSWER KEY > Who Was Anne Frank?

by The United States Holocaust Memorial Museum 2016

1. **RI.2**

PART A: Which phrase best identifies the central idea of this text?

A. Without the help of family, Anne Frank did not have any chance of surviving the Holocaust.

B. Anne Frank was one of many victims of the Holocaust, but her story lives on because of her diary and the people that helped to preserve her story.

C. We know about the horrors of the Holocaust because Jewish children like Anne Frank wrote about their experiences.

D. Anne Frank displayed tremendous optimism in the face of danger and she was a great inspiration to Miep Gies.

2. **RI.1**

PART B: Which quote from the text best supports the answer to Part A?

A. "The rest of the Frank family followed Otto, with Anne being the last of the family to arrive" (Paragraph 2)

B. "Miep Gies, had previously helped to prepare the hiding place and smuggled food and clothing to the Franks" (Paragraph 4)

C. "Anne Frank has become a symbol for the lost promise of the children who died in the Holocaust." (Paragraph 8)

D. "While in hiding, Anne kept a diary in which she recorded her fears, hopes, and experiences." (Paragraph 8)

3. **RI.4**

PART A: What does the phrase "transit camp" most closely mean as it is used in paragraph 3?

A. a location where Jews could reunite with their family members

B. a place where Jews hid until the Holocaust was over

C. a final destination Jews were sent to after being arrested

D. a waiting area for Jews before they were moved to a different area

4. **RI.1**

PART B: Which selection from the text best supports the answer to Part A?

A. "From Westerbork, German officials deported the Jews" (Paragraph 3)

B. "Auschwitz-Birkenau and Sobibor killing centers" (Paragraph 3)

C. "German authorities and their Dutch collaborators began to concentrate Jews" (Paragraph 3)

D. "Anne and her family went into hiding" (Paragraph 4)

5. **RI.5**

In the final paragraph, Anne Frank is referred to as “a symbol for the lost promise of the children who died in the Holocaust.” What does this mean and how does it contribute to the development of ideas in the text? Cite evidence from the text to support your answer.

Answers will vary; students should discuss how Anne Frank represents so many children, past and present, who have experienced mass extermination. “Promise,” refers to the potential impact Anne and other children could have had on the world if their lives were spared. The overall text describes Anne’s hiding, death, and memory, which continues to inspire children today. The sentence preceding the quote mentions the impact that Anne’s story has had over the years. “It was published after the war in many languages and is used in thousands of middle school and high school curricula in Europe and the Americas” (Paragraph 8). Her death prevented her from writing even more influential texts. “Anne Frank was one of over one million Jewish children who died in the Holocaust” (Paragraph 1). Like Anne, there are so many children who died in the Holocaust. The abrupt ending of Anne Frank’s life symbolizes the loss of all of the other children who also could have had an impact on the world if they were given the chance.