Module 3: Activity 4

The Clean Air Act

IT'S OUR AIR

SUMMARY

Students will act as marketing directors tasked with choosing a historical event to be the focus of a public awareness campaign celebrating the 50th anniversary of the Clean Air Act. Students will research air quality trends since the passage of the Act and explore multi-media sources to learn about three historical events that set the stage for its passage: the 1948 Donora Smog, the mid-century development of smog in Los Angeles, and the publication of *Silent Spring*. After choosing an event to highlight, students will write a report supporting their choice. As an extension, students can create the marketing campaign.

ESSENTIAL QUESTIONS

- Is air pollution getting better or worse in the United States (activity); in North Carolina (video)?
- How did historical events set the stage for the passage of the Clean Air Act?
- What role does regulation play in improving or maintaining air quality?

TIME NEEDED

For AP and honors classes, this activity will take two full 90-minute block periods. Allow two and a half block periods for academic earth science classes.

North Carolina ESSENTIAL STANDARDS FOR EARTH/ENVIRONMENTAL SCIENCE

- EEn.2.5.5 Explain how human activities affect air quality.
- EEn.2.7.3 Explain how human activities affect the biosphere.
- EEn.2.8 Evaluate human behaviors in terms of how likely they are to ensure the ability to live sustainably on Earth.

Other standards: HS. SI.1.1 and HS. SI.1.2. (See Resources section for explanation.)

A product of the NC Air Awareness Program 2016.

MAKING CONNECTIONS

Finding the right balance when designing solutions to complex environmental issues is a challenge. Whether you're talking about legislation having to do with air quality, pay for public school teachers, or consumers' right to privacy, there is always a discussion about the public need vs. the monetary costs to businesses, utilities, or taxpayers. It's never easy because there are so many different factors to consider and some of those are not easy to measure. In the case of air quality, one must consider the problems caused by poor air quality, the benefits of good air quality, the costs of preventing air pollution, and the value of preventing air pollution. Different groups of people may come to a different conclusion when faced with the same information, depending on their values and their experience in life. There's never just one right answer. After legislation is enacted, it is important to collect data and try to analyze whether the legislation is accomplishing the intended goals.

BACKGROUND

Air pollution has been around for a long time, but prior to the Industrial Revolution (1760-1850), people didn't have a good understanding of the atmosphere or air pollution. In general, people in cities were used to many and varied foul smells and focused their energies on the hard work of surviving. London's air was famously dirty due in large part to the fact that people burned coal in their homes. When the emissions from coal-powered steam engines in factories, trains, and ships were added to the famous fog, the air could be noticeably dirty and dangerous to breathe. The London Coal Fog of 1880 lasted three days; high levels of sulfur dioxide and particulate matter killed thousands of people. A similar event in 1952 killed about 4,000 people and led to the United Kingdom's Clean Air Act in 1956.

NOTE ON TERMINOLOGY

Students may have questions about the word "smog" in this activity. "Smog" doesn't have a precise scientific definition. It is thought to have originated in London in the early 1900s as a combination of "smoke" and "fog." It's used in a non-scientific way to refer to air pollution that is visible. The smog of Donora, Pennsylvania, had a different chemical composition than the smog of Los Angeles. It's important for students to understand that while smog refers to visible air pollution, the word doesn't specify a particular type of pollution.

THE 1948 DONORA SMOG

From October 27-30, 1948, a deadly air pollution event occurred in Donora, Pennsylvania. The air pollution killed 21 people and sickened nearly half the town. Scientists say the actual toll will never be known, and that there was a higher than usual death rate for years afterward.

The smog was a combination of sulfuric acid, nitrogen dioxide, fluorine, carbon monoxide, and other pollutants, emitted by U.S. Steel's Donora Zinc Works and American Steel and Wire Plant. The smog was so thick that streetlights came on in the middle of the day.

Residents of Donora were used to some amount of this smog, but in the last week of October, 1948, a weather condition called a "temperature inversion" created a very stable (i.e., stagnant) layer of air that allowed the pollutants to build up to lethal levels. (Recall that in the troposphere, temperatures usually decrease with elevation. Because cold air is more dense than warm air, the cold air tends to sink while the warm air tends to rise, a situation that creates a lot of mixing in the troposphere. However, in an inversion, temperatures rise with elevation in the troposphere, which reduces air movement and mixing. More information on inversions at: www.wrh.noaa.gov/slc/climate/TemperatureInversions.php)

On October 31, 1948, the inversion broke up and it rained in Donora, both of which helped to clean the air. The Donora pollution episode made it clear to a lot of people in the United States that air pollution could be deadly, not just unsightly. The disaster made national news and inspired many leaders to pass local and state laws regulating air pollution. In fact, many people say the Donora episode was the first step leading to the passage of the Clean Air Act.

THE DEVELOPMENT OF SMOG IN LOS ANGELES IN THE 1940s AND 50s

Los Angeles is situated in a basin surrounded on three sides by mountains. In the mid-20th century, the population of Los Angeles soared. During that time, the combination of the topography, climate, vehicle emissions, and emissions from industry began creating a brown polluted haze that caused health problems ranging from stinging eyes to emergency department visits. The haze often obscured the nearby mountains. While the city was known for its sunny weather and movies stars, it was also famous for its smog. During a particularly bad spell in September 1955, ozone levels in downtown Los Angeles reached 850 ppb. That's more than ten times the amount that would cause a health alert today. It was a hazardous situation.

SILENT SPRING

Rachel Carson (1907-1964) earned a master's degree in zoology and in 1936 began working as a junior aquatic biologist at the Bureau of Fisheries. She eventually became the editor-in-chief for the U.S. Fish and Wildlife Service. She enjoyed writing and published three best-selling and award-winning books about the ocean, called *Under the Sea Wind*, *The Sea Around Us*, and *The Edge of the Sea*. In 1962, she published the book *Silent Spring*, warning about the dangers of indiscriminate use of synthetic chemicals, in particular the pesticide DDT. Chemical companies fought back, criticizing the book and Carson herself. In 1963, she testified before Congress on the need for policies to protect human health and wildlife from overuse of pesticides. In 1964, she died of breast cancer. In 1969, the use of DDT was restricted in the United States; in 1972, it was banned. Many other countries continue to use this toxic chemical to date.

THE CLEAN AIR ACT: THE EARLY YEARS

Congress created and passed the Air Pollution and Control Act in 1955, which provided federal funds for research into air quality. In 1963, Congress passed the Clean Air Act, which funded research into technology for monitoring and controlling air quality. In 1967, the Air Quality Act expanded funding for that research.

THE CLEAN AIR ACT: CREATION OF THE EPA AND AIR QUALITY STANDARDS

In 1970, a Senate Republican and a Senate Democrat wrote a new and improved version of the Clean Air Act, which included the creation of an agency responsible for carrying out the Act: the United States Environmental Protection Agency (EPA). The Act passed unanimously in the Senate.

The Clean Air Act requires EPA to set limits on air pollutants. These limits are called the National Ambient Air Quality Standards (NAAQS). The standards are based on the latest scientific evidence about the effects of each pollutant on human health and the environment.

Individual states, local governments, and tribes are responsible for monitoring the pollutants and developing air quality management plans to meet the standards. As for individual companies that are not complying with the Clean Air Act, the EPA can require compliance, force payment of penalties, and sue the violator in court.

THE CLEAN AIR ACT: AMENDMENTS

In 1977, amendments were passed that incorporated the idea of nonattainment. Areas that do not meet the standards are called "nonattainment" areas. These areas must develop an EPA-approved plan to meet the standards and may face sanctions if they cannot meet them after a certain amount of time. For example, counties in nonattainment for ozone may be denied federal funds for building more highways until they come into compliance. The amendments also include provisions for stricter standards for particulate matter and sulfur dioxide in national wildlife areas.

In 1990, amendments were passed that addressed the control of acid rain, established the permitting regulations states use to keep air clean, expanded toxic pollution definitions, and planned for phase-out of chemicals related to the depletion of the ozone layer.

THE CLEAN AIR ACT TODAY

Today's Clean Air Act covers six criteria air pollutants: lead, ozone, particulate matter, carbon monoxide, nitrogen dioxide, and sulfur dioxide. These pollutants are also called "common" air pollutants, because they are widespread across the United States. Because they are widespread, they have the potential to affect the health of a large segment of the population. For more information on these pollutants see "The Criteria Pollutants and a Closer Look at Ozone" and the accompanying Criteria Pollutants video (Module 1, Activity 4).

The EPA sets standards for each criteria pollutant, and must review the standards every five years to make sure that they are adequately protecting human health and the environment. As the science of studying and detecting air pollution advances, the standards may change. In 2008, for example, the 8-hour ozone standard changed from 0.08 parts per million to 0.075 parts per million (75 parts per billion). In October of 2015, the standard changed to 0.07 parts per million (70 parts per billion).

IS THE CLEAN AIR ACT WORKING?

Yes! Since 1970, when the Clean Air Act was revised and the EPA was created, emissions of the six criteria pollutants in the United States have decreased by 68%.

During that same time, the gross domestic product has more than tripled, vehicle use has almost tripled, and population has increased by more than 1.5 times.

While the levels of all the criteria pollutants have dropped, carbon monoxide and lead have decreased the most dramatically, due to improvements in vehicle emission control (carbon monoxide) and the elimination of leaded gasoline (lead).

Ground-level ozone and particle pollution remain problematic in many areas of the country, particularly urban areas.

NORTH CAROLINA'S CLEAN SMOKESTACKS LEGISLATION

In 2002, North Carolina legislators passed the Clean Smokestacks Bill, also known as the Improve Air Quality/Electric Utilities Bill (Session Law 2002-4). Its goal was to reduce ozone-forming pollutants and particle pollution emitted by coal-fired power plants in the state by about three-fourths over the course of a decade. Specifically, coal-fired plants were required to reduce emissions of nitrogen oxides (NO_x) by 77% in 2009 and emissions of sulfur dioxide (SO_2) by 73% in 2013 – goals that were met on time.

As a result of Clean Smokestacks, levels of ozone and particulate matter have decreased, as well as acid rain and nitrogen deposition in natural waters. As an added benefit, the technology to reduce those emissions also reduces the amount of mercury emitted. The legislation has improved the health of North Carolinians, according to data from a scientific study. For more information on this study, titled "Long-term dynamics of death rates of emphysema, asthma, pneumonia and improving air quality," see the Resources section as well as "Scientific Literacy: Health Problems and Air Pollution" (Module 3, Activity 1).

MATERIALS

- Access to internet
- Material for the 1948 Donora Smog
  - "Smog Deaths in 1948 Led to Clean Air Laws" (NPR radio piece, available online)
  - 4 historical photos of Donora, PA (included with activity)
  - Letter to the Pennsylvania Governor from a citizen in 1948, and transcript (included with activity)
- Material for the Development of Smog in Los Angeles in the 1940s-50s
  - "How Los Angeles Began to Put its Smoggy Days Behind" (KCET.org article, available online)
  - 3 historical photos of Los Angeles smog (included with activity)
  - Political cartoon about Los Angeles smog (included with activity)
- Materials for *Silent Spring*
  - Excerpt from *Silent Spring* (included with activity)
  - "The Price of Progress" (CBS News video, available online)
  - Political cartoon about *Silent Spring* (available online)

NORTH CAROLINA CLEAN SMOKESTACKS REGULATION **VIDEO**

- Reviews the history of the North Carolina Clean Smokestacks Regulation and why it came about.
- Reports on the impact of the regulation on North Carolina air quality and the health of N.C. residents.
- Highlights the impact on a teenager with asthma.

Video Length: 9:30 minutes
Key Elements: interviews and video footage

WARM**UP**

In a class discussion, ask the students what clean air is and whether the air quality in the United States is getting better or worse, and why they think so. (As defined in the Clean Air Act, clean air can have pollution in it as long as it's not enough to harm human health.) Ask students what they know about the Clean Air Act – why it was passed, when it was passed, whether it has been effective or not.

Teacher Tips

Remember for this activity, you should show the video to students after they do the activity.

For AP Environmental classes, Part A can be done as homework the night before the activity, then reviewed in class as part of the Warm Up. For academic earth science classes, you can save time in Part A by sharing the information in the answer key rather than having them fill in the chart themselves. You could also answer the questions on page 2 of Part A as a class. In part B, consider giving them a couple of examples of bias from the sources and allow them to skip the parts of the note-taking guides that deal with point of view and bias if you think that part will be too challenging.

If you choose to do Part A in class, note that sometimes the websites won't work if all the students are using them at the same time, so you may want to project the websites for everyone to view together.

– Mark Townley

THE ACTIVITY

As a marketing director for the EPA, you've been asked to create a campaign to celebrate the 50th anniversary of the Clean Air Act. The campaign will focus on one historic event that led to the passage of the Clean Air Act as a way to engage the public in the history and the success of the act. Your job will be to research the improvements in air quality since the Clean Air Act was passed (Part A), choose the historic event to highlight in the campaign (Part B), and write a report explaining your decision (Part C).

PART A: Trends in Air Quality Since the Clean Air Act

Fill in the following chart.

For the first two blank columns, use information from the Six Common Pollutants website (www.epa.gov/criteria-air-pollutants). On the website, choose a pollutant. Then you can click on "health" and "air emission sources" to find the information you need. You can also reach information about air emissions sources for each criteria pollutant here: www.epa.gov/air-emissions-inventories/air-emissions-sources.

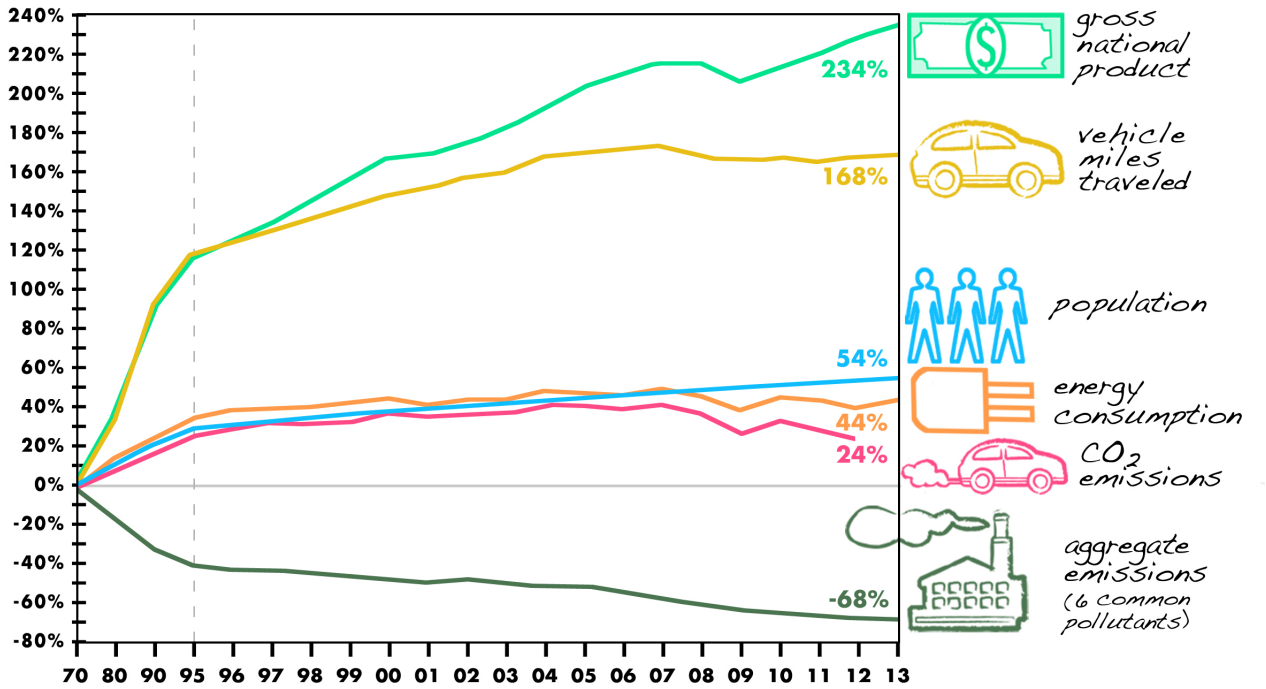
To fill in the last two columns of the chart, use information from the EPA Air Trends website (www.epa.gov/air-trends). Note that the air trends data are given since 1980 for most of the pollutants, even though the Clean Air Act was passed in 1970. That's because it took some time to develop the technology and infrastructure to monitor the pollutants accurately, precisely, and consistently in all the locations across the United States.

The Six Criteria Pollutants: Sources, Health Effects, and Decrease over Time [ANSWER KEY]

(Based on information from 2013; check the Air Trends website for updated information.)

Air Pollutant	Some of the main sources	Some of the main health effects	Decrease in national average	Describe decrease over time and relationship to standard
Carbon monoxide (since 1980)	[Vehicles]	[Reduces oxygen to organs; can cause death]	[84%]	[Fairly rapid and steady; average started near standard and is now well below]
Ground level ozone (since 1980)	[Ingredients are NO_x and VOC, heat and sunlight]	[Coughing, asthma attacks, shortness of breath, makes lung diseases worse]	[33%]	[Hasn't decreased as much as others; more up and down; average is barely below standard]
Lead (since 1980)	[Old paint and leaded gas; now in soils and water]	[Many including neurological deficits in children; cardiovascular (CV) problems in adults]	[92%]	[Sharp decrease at first, then leveled out; average is near the standard]
Nitrogen dioxide (since 1980)	[Vehicles; generating electricity]	[Inflames airways; worsens asthma]	[60%]	[Slow and steady; began near standard and now well below standard]
PM10 (since 1990)	[Dust, farming, fires]	[Causes problems for lungs and CV system]	[34%]	[Slow and steady; has been well below standard]
PM2.5 (since 2000)	[Fires, dust, farming]	[Causes problems for lungs and CV system]	[34%]	[Slow and steady; now below standard]
Sulfur dioxide (since 1980)	[Generating electricity]	[Inflames airways; worsens asthma]	[81%]	[Slow and steady; average is now well below standard; very wide range]

Pollution Trends in the United States



Source: www.epa.gov/air-trends
NOTE: After 1995, these data are shown in one year increments.

Using the information in the graph above, answer the following questions:

1. How much have emissions of the six common air pollutants declined in aggregate (as a group) since 1970? [**Answer**: 68%]
2. Do you think those emissions would have declined that much without the Clean Air Act? Why or why not? [**Answer**: No, because it would be hard to attain such drastic decreases without coordinated and large-scale efforts of the nation, states and industries]
3. Do you think the Clean Air Act is the only reason the emissions declined over that time period? What other factors may have played a role? [**Answer**: Other regulations (such as state regulations), local governments, community groups, nonprofits, and individuals have played a role.]
4. Can the economy still grow while emissions of air pollutants are being reduced? Justify your answer using information from the graph. [**Answer**: Yes. The graph shows that since 1970 the gross domestic product grew 234% while emissions fell 68%.]

PART B: Historic Events Leading up to the Clean Air Act

Your teacher will give you information about three historic events: the 1948 Donora Smog; the development of smog in Los Angeles in the 1940s and 1950s; and the publication of *Silent Spring* by Rachel Carson in 1962. Your job is to review the sources, take notes using the worksheets provided, and choose one event that you believe should be the focus of the campaign celebrating the 50th anniversary of the Clean Air Act. (In Part C of this activity, you will have to provide a written argument supporting your choice.)

Sources for the 1948 Donora Smog

Radio News Story
(National Public Radio 2009)
"Smog Deaths in 1948 Led to Clean Air Laws"
by Ann Murray, NPR.org, April 22, 2009
www.npr.org/templates/story/story.php?storyId=103359330

Historical Photos
Four historical photos of Donora, PA (included with activity)

- Aerial photo of American Steel and Wire works, September 1941
- Donora-Webster bridge over the Monongahela River
- Smokestacks from 3rd Street, 1943-1955
- Smokestacks, as seen from across the river, 1948

Letter to Governor
Handwritten letter from Mrs. Lois Bainbridge to Pennsylvania Governor Duff, October 31, 1948 (included with activity)
Typed transcript of letter (included with activity)

Sources for the Development of Smog in Los Angeles in the 1940s and 1950s

News Article
KCET(2012)
"How Los Angeles Began to Put its Smoggy Days Behind"
by Jeremy Rosenberg, KCET.org, February 13, 2012
www.kcet.org/socal/departures/columns/laws-that-shaped-la/how-los-angeles-began-to-put-its-smoggy-days-behind.html

Historical Photos
Three historical photos showing the smog and reactions to it (included with activity)

- Los Angeles Civic Center January 6, 1948
- Smog Protection Experiment at the University of Southern California, 1947
- Citizens Protesting Los Angeles Smog

Political Cartoon
Stamp Out Smog: Los Angeles City Hall Yelling for Help
(included with activity)

Sources for *Silent Spring* by Rachel Carson (1962)

Excerpt from *Silent Spring*
Paragraph from Chapter 14 about humanity's contribution to pollution (included with activity)
by Rachel Carson, 1962

Televisions News Story
(CBS News)
"The Price of Progress," reporting on Rachel Carson's legacy
September 19, 2007
www.cbsnews.com/videos/the-price-of-progress/

Political Cartoon
"*Silent Spring* by Rachel Carson the Pesticide Threat," a woman swatting a bug with a copy of Silent Spring
by Len Norris, June 9, 1964
http://edocs.lib.sfu.ca/cgi-bin/Cartoons?CartoonID=904

Note-Taking Guide

Use the three note-taking guide worksheets (or an Excel spreadsheet) to take notes about the sources, including point of view, bias, and whether you believe the source to be trustworthy. Also write down important quotes that you may want to use to bolster your argument when it comes time to choose one event to highlight in your marketing campaign.

The 1948 Donora Smog

Type of media	Point of view. Describe bias if any. Does the source seem trustworthy?	Important quotes from the source
Radio news story from NPR (2009)		
Historical photos of the event		
Letter from event survivor written in 1948		

Los Angeles Smog in 1940s and 50s

Type of media	Point of view. Describe bias if any. Does the source seem trustworthy?	Important quotes from the source
Article written in 2012		
Historical photos		
Political Cartoon		

Silent Spring by Rachel Carson (1962)

Type of media	Point of view. Describe bias if any. Does the source seem trustworthy?	Important quotes from the source
Excerpt from *Silent Spring*		
CBS Video (2007)		
Political cartoon		

Argument Guide

From the sources provided, identify 1-3 strong arguments that each event led to the creation of the Clean Air Act. Reference at least one specific piece of evidence from the sources for each argument.

Event	Argument(s) that this event led to CAA	Evidence/quote from the sources supporting this argument
The 1948 Donora Smog		
Los Angeles Smog		
Publication of *Silent Spring* 1962		

PART C: Writing your Report

Which of the three historical events do you believe was most important in setting the stage for the passage of the Clean Air Act? Write a report explaining why that event should be highlighted in the campaign to celebrate the 50th anniversary of the Clean Air Act. Use the arguments you came up with in Part B for that event.

Imagine that the audience for the report is a Board of Directors that includes the grand-nephew of Rachel Carson, a survivor of the Donora Smog event of 1948, and the mayor of Los Angeles. Each of these people will be disappointed if you do not choose "their" event, so make sure that your report is polite and professional and that your arguments are clear and well-supported.

Your report will be graded on

- theme, focus, and organization (Did you clearly state your claim at the beginning of the report? Did you finish with a strong conclusion that referenced that claim? Did you stay on topic and present your ideas in a logical fashion? Does your report flow smoothly throughout?)
- elaboration of evidence (Did you elaborate on your arguments using evidence from the sources? Did you address alternate claims, by explaining why the event you chose is more appropriate than the other two?)
- convention (Were your spelling, punctuation, grammar, and usage correct? Was your tone professional and polite?)

WRAP UP **AND** ACTION

Ask students to share which event they picked and why. Invite students to debate the pros and cons of each event as a focus of the marketing campaign.

Discuss the success of the Clean Air Act in improving and maintaining air quality in the United States and ask students whether regulation is sufficient to protect air quality. What about personal choice? What role do individuals, businesses, civic groups, state and local governments play?

Show the video about North Carolina Clean Smokestacks Act of 2002.

ASSESSMENT

Use the following rubric to grade the students' work (20 pts maximum):

	4 points	**3 points**	**2 points**	**1 point**	**0**
Note-Taking Guide	Responses indicate good grasp of bias and appropriate choice of quotes	Responses indicate limited grasp of bias **OR** inappropriate choice of quotes	Responses indicate limited grasp of bias **AND** inappropriate choice of quotes	Responses indicate little grasp of bias and poor choice of quotes	Not turned in
Argument Guide	Arguments demonstrate good grasp of the significance of each event	Arguments demonstrate good grasp of the significance of some but not all events	Arguments demonstrate limited grasp of the significance of the events	Arguments demonstrate very little grasp of the significance of the events	Not turned in
Report: theme, focus, organization	Report is clear, well-organized, logical, and flows well.	For the most part, report is clear, well-organized, logical and flows well	Report may be unclear, disorganized, disjointed, **OR** have problems with logic	Report is unclear, disorganized, disjointed, **AND** has problems with logic	Not turned in
Report: elaboration of evidence	Report is convincing; refers to evidence from the sources; addresses alternate claims	Report lacks sufficient evidence **OR** does not address alternate claims	Report does not contain sufficient evidence from sources **AND** does not address alternate claims	Report does not contain any evidence from the sources	Not turned in
Report: Conventions	Report contains correct spelling, punctuation, grammar, usage, and appropriate tone	Report contains some mistakes in spelling, punctuation, grammar, usage, or uses inappropriate tone	Report contains many mistakes in spelling, punctuation, grammar, usage, and tone	Report shows little grasp of language conventions	Not turned in

EXTENSIONS

Have students create materials for the marketing campaign using information about air quality trends and the historical event that they chose in this activity. Depending on how much time is available, this could vary from simply creating a plan for a campaign to actually creating some of the pieces, such as public service announcements, posters, or brochures.

Ask students whether there are any other pollutants they believe should be regulated by the Clean Air Act, and if so, which ones? Have students do research to find out what other pollutants are regulated by the Clean Air Act.

RESOURCES

EPA's air quality trends in the United States (contains information about the drop in pollutants and the rise in gross domestic product, vehicle miles traveled, population, energy consumption and carbon dioxide emissions since 1970 and since 1980): www.epa.gov/air-trends

EPA's ambient air quality monitoring website: www.epa.gov/amtic

Up-to-date information on the North Carolina Clean Smokestacks legislation is available from the Division of Air Quality: http://daq.state.nc.us/news/leg/

The Clean Smokestacks Bill (8 pages): http://ncga.state.nc.us/Sessions/2001/Bills/Senate/PDF/S1078v5.pdf

The Plain English Guide to the Clean Air Act, published by the EPA in 2007: www.epa.gov/clean-air-act-overview/plain-english-guide-clean-air-act

First-person history of the passage of the Clean Air Act of 1970: www.muskiefoundation.org/baker.030905.html

Scientific study on respiratory health in North Carolina since the Clean Smokestacks Act:

"Long-term dynamics of death rates of emphysema, asthma, pneumonia and improving air quality" by Julia Kravchenko, Igor Akushevich, Amy P. Abernethy, Sheila Holman, William G. Ross Jr., H. Kim Lyerly.

http://dukespace.lib.duke.edu/dspace/handle/10161/8919

OTHER NORTH CAROLINA ESSENTIAL STANDARDS

HS.SI.1.1 Evaluate resources for reliability. (Reliability can be determined by currency, credibility, authority, etc. depending on the curriculum topic.)

HS.SI.1.2 Evaluate resources for point of view, bias, values, or intent of information.

Student Page
Page #1

Choose Campaign for Clean Air Act Anniversary Celebration

As a marketing director for the EPA, you've been asked to create a campaign to celebrate the 50th anniversary of the Clean Air Act. The campaign will focus on one historic event that led to the passage of the Clean Air Act as a way to engage the public in the history and the success of the act. Your job will be to research the improvements in air quality since the Clean Air Act was passed (Part A), choose the historic event to highlight in the campaign (Part B), and write a report explaining your decision (Part C).

PART A: Trends in Air Quality Since the Clean Air Act

Fill in the following chart.

For the first two blank columns, use information from the Six Common Pollutants website (www.epa.gov/criteria-air-pollutants). On the website, choose a pollutant. Then you can click on "health" and "air emission sources" to find the information you need. You can also reach information about air emissions sources for each criteria pollutant here: www.epa.gov/air-emissions-inventories/air-emissions-sources.

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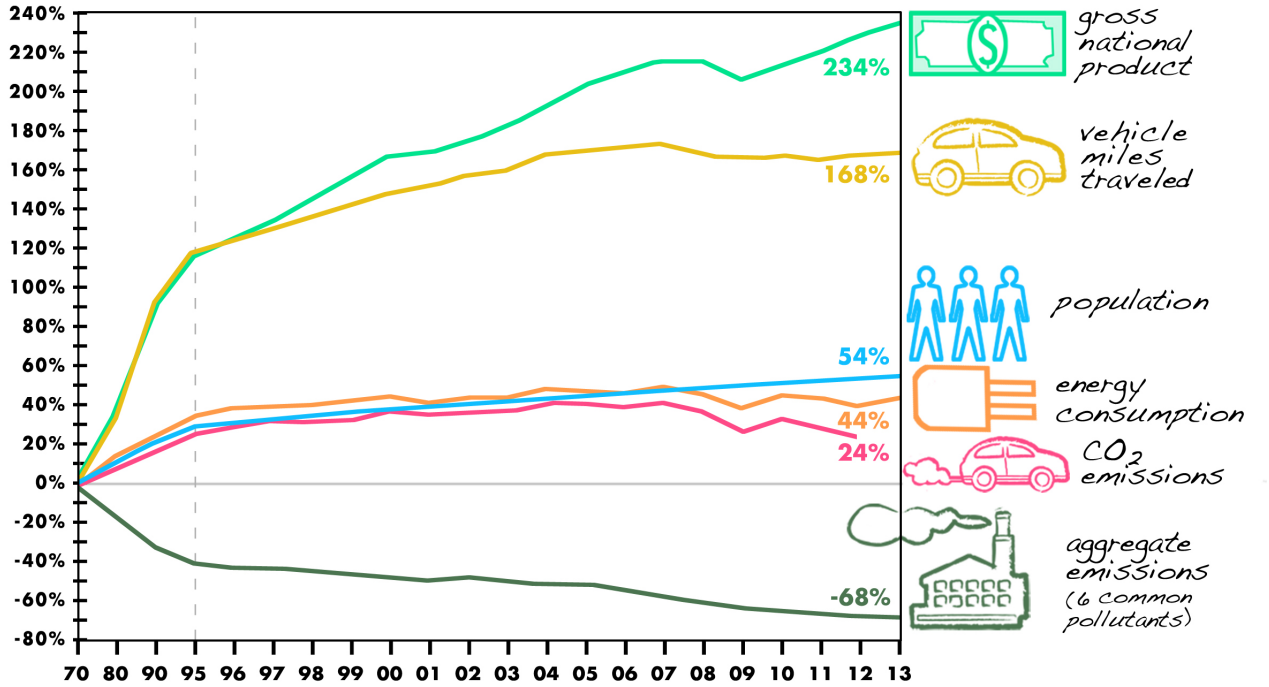
The Six Criteria Pollutants: Sources, Health Effects, and Decrease over Time

Air Pollutant	Some of the main sources	Some of the main health effects	Decrease in national average	Describe decrease over time and relationship to standard
Carbon monoxide (since 1980)				
Ground level ozone (since 1980)				
Lead (since 1980)				
Nitrogen dioxide (since 1980)				
PM10 (since 1990)				
PM2.5 (since 2000)				
Sulfur dioxide (since 1980)				

PART A: Trends in Air Quality Since the Clean Air Act (continued)

Pollution Trends in the United States



Source: www.epa.gov/air-trends
NOTE: After 1995, these data are shown in one year increments.

Using the information in the graph above, answer the following questions:

1. How much have emissions of the six common air pollutants declined in aggregate (as a group) since 1970?

2. Do you think those emissions would have declined that much without the Clean Air Act? Why or why not?

3. Do you think the Clean Air Act is the only reason the emissions declined over that time period? What other factors may have played a role?

4. Can the economy still grow while emissions of air pollutants are being reduced? Justify your answer using information from the graph.

Student Page
Page #3

PART B: Historic Events Leading up to the Clean Air Act

Your teacher will give you information about three historic events: the 1948 Donora Smog; the development of smog in Los Angeles in the 1940s and 1950s; and the publication of *Silent Spring* by Rachel Carson in 1962. Your job is to review the sources, take notes using the worksheets provided, and choose one event that you believe should be the focus of the campaign celebrating the 50th anniversary of the Clean Air Act. (In Part C of this activity, you will have to provide a written argument supporting your choice.)

Note-Taking Guide

Use the three note-taking guide worksheets (or an Excel spreadsheet) to take notes about the sources, including point of view, bias, and whether you believe the source to be trustworthy. Also write down important quotes that you may want to use to bolster your argument when it comes time to choose one event to highlight in your marketing campaign.

Argument Guide

From the sources provided, identify 1-3 strong arguments that each event led to the creation of the Clean Air Act. Reference at least one specific piece of evidence from the sources for each argument.

PART C: Writing your Report

Which of the three historical events do you believe was most important in setting the stage for the passage of the Clean Air Act? Write a report explaining why that event should be highlighted in the campaign to celebrate the 50th anniversary of the Clean Air Act. Use the arguments you came up with in Part B for that event.

Imagine that the audience for the report is a Board of Directors that includes the grand-nephew of Rachel Carson, a survivor of the Donora Smog event of 1948, and the mayor of Los Angeles. Each of these people will be disappointed if you do not choose "their" event, so make sure that your report is polite and professional and that your arguments are clear and well-supported.

Your report will be graded on

- theme, focus, and organization (Did you clearly state your claim at the beginning of the report? Did you finish with a strong conclusion that referenced that claim? Did you stay on topic and present your ideas in a logical fashion? Does your report flow smoothly throughout?)
- elaboration of evidence (Did you elaborate on your arguments using evidence from the sources? Did you address alternate claims, by explaining why the event you chose is more appropriate than the other two?)
- convention (Were your spelling, punctuation, grammar, and usage correct? Was your tone professional and polite?)

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Note-Taking Guide

The 1948 Donora Smog

Type of media	Point of view. Describe bias if any. Does the source seem trustworthy?	Important quotes from the source
Radio news story from NPR (2009)		
Historical photos of the event		
Letter from event survivor written in 1948		

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Note-Taking Guide (continued)

Los Angeles Smog in 1940s and 50s

Type of media	Point of view. Describe bias if any. Does the source seem trustworthy?	Important quotes from the source
Article Written in 2012		
Historical Photos		
Political Cartoon		

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Note-Taking Guide (continued)

Silent Spring by Rachel Carson (1962)

Type of media	Point of view. Describe bias if any. Does the source seem trustworthy?	Important quotes from the source
Excerpt from *Silent Spring*		
CBS Video (2007)		
Political Cartoon		

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Argument Guide

Event	Argument(s) that this event led to CAA	Evidence/quote from the sources supporting this argument
The 1948 Donora Smog		
Los Angeles Smog		
Publication of *Silent Spring* 1962		