Two Year Course Sequence: Air Quality Curriculum

Pathway Course	Content	Materials/ Enrichment
100- Introduction to Air Quality Science and Policy	• Why, How, What of Pollution • Intro to Policy • Air Sensors, Data Methods & Fluency • Awareness PSA/Infographic	Field Trips: • Site Air Monitoring Visit • Air District Lab Visit
200- Environmental Technology	• Air Pollution Types and Producers (Generators) • Engineering Tasks/Challenges • Investigating Local Industry/Generators	Field Trips: • SMUD and Other Power Plants • Siemans for Air Monitoring • Air Products - Hydrogen Producing Facility
250- Conservation & Environmental Justice	• Why Conservation & Social Justice • History of Social Justice Movement • Federal, State, Local Agencies • Employment in Air Quality Control	Field Trips: • CARB Headquarters
300- Environmental Policy & Advocacy	• Culminating Project: Policy Change Proposal • Job Shadow/ Internship • Portfolio & Defense of Learning Presentation	Job Shadow/Internship

Course Title: 100 Foundations of Air Quality Control

100 Course Description: This course introduces students to the policy, principles and practices of clean air technology, including air pollution sources, effects, and control measures. Students will learn about various technologies used to reduce air pollution, such as particulate matter, gaseous emissions, and greenhouse gas emissions. The course will also cover energy efficiency and sustainability concepts related to clean air technology. The course follows a project-based learning approach in which students will work in teams to solve real-world local issues.

Unit 1: Introduction to Clean Air Science and Policy
Essential Question 1: ● How does air pollution impact our health and the environment, and how can we effectively communicate these complex effects? **Essential Question 2:** ● Has the Clean Air Act been effective at reducing air pollution?
Essential Understanding 1: ● Air pollution has far-reaching impacts on human health and the environment, and effective communication is essential to convey the complexities of these effects. Example: particulate matter (PM) in the air can cause respiratory illnesses, such as asthma and lung cancer. **Essential Understanding 2:** ● The Clean Air Act is a landmark piece of environmental legislation designed to protect human health and improve overall air quality. The Act resulted from mounting public pressure driven by increasing awareness of air pollution's detrimental consequences and it established crucial regulatory frameworks, enforceable limits on certain pollutant emissions, and dedicated resources toward ongoing research and technological advancements.
Assessment: ● Clean Air Act Claim Evidence and Reasoning Paragraph (lesson 4)
Objectives & Standards: Lesson 1: What is air pollution? ● **Describe various types of air pollution**, Writing Standards: 11-12.2 ○ Students will communicate complex ideas and concepts clearly and accurately, demonstrating their comprehension of the topic through effective content organization and analysis. ● **Describe solid and gas forms of air pollution** ○ Students will communicate complex ideas and concepts clearly and accurately, demonstrating their comprehension of the topic through effective content organization and analysis. Lesson 2: Building an Air Sensor ● **Recognize the harmful effects of air pollution**, Science and Engineering Practices: SEP 6

    - Students will explain the harmful effects of air pollution and articulate the cause-and-effect relationships between air pollution and its impacts on health and the environment.
- **Define sensitive receptors**
- **Understand the proper application of various sensor types**
- **Identify potential sources of air pollution**, Reading Standards for Informational Text: 11-12.9
    - Students will research information from various sources to identify and understand the sources of air pollution.

Lesson 3: What is the science of air pollution?

- **Understand the fundamentals of atmospheric science**, Earth and Space Sciences: ESS.3
    - Students will explore the chemicals and the Earth and Human Activity (ESS.3) aspects related to air pollution and atmospheric science.
- Create simple graphs from atmospheric data (NGSS SEP 4)

Lesson 4: Intro to Clean Air Act

- **Understand the history and purpose of the Clean Air Act**
    - Students will be able to explain the reasons behind the creation of the Clean Air Act, describe its main goals and provisions, and identify key milestones in its development. (Reading Standards for Informational Text: 11-12.9)
- **Recognize the impact of the Clean Air Act on air quality and public health**
    - Students will analyze data showing trends in air pollution levels before and after the implementation of the Clean Air Act, compare these findings with studies on health outcomes related to air pollution (NGSS SEP 4)
    - Discuss how the law has contributed to improved air quality and better health outcomes.

Unit 2: Particulate Matter Control Technologies

Essential Question 1:

- What particulate matter control technologies are effective in reducing air pollution, and how can we design and evaluate our own particulate matter filters to contribute to cleaner air?

Essential Understanding 1:

- Effective particulate matter control technologies play a crucial role in reducing air pollution levels, and designing and testing custom filters can contribute to innovative solutions for cleaner air.
    - Example: Established technologies like fabric filters and electrostatic precipitators are used in industrial settings to remove particulate matter from emissions. However, students can design and test their own filters using materials like activated carbon or specialized fabrics to reduce particulate matter concentrations in indoor spaces, improving indoor air quality.

Assessment:

- "Particulate Matter Filter Design Challenge" - Students will design and build their own particulate matter filters using different materials and techniques. They will test the efficacy of their filters and compare them to commercial products.

Objectives & Standards:

Lesson 1: PM2.5 and Filtering

- Understand the different types of particulate matter, recognize the health effects of particulate matter exposure, and evaluate the effectiveness of various particulate matter control technologies, Science and Engineering Practices (SEP 8).
- Identify types and characteristics of particulate matter, Reading Standards for Informational Text (11-12.9).
- Understand health effects of particulate matter exposure, Reading Standards for Informational Text (11-12.9).
- Career Readiness 10.5: Maintain and troubleshoot equipment used in the energy, environment, and utilities industry.

Lesson 2: Building and Testing a Filter:

- Understand impact of particulate matter control technologies (e.g., fabric filters, electrostatic precipitators, scrubbers), Science and Engineering Practices (SEP 6).
- Career Readiness 10.5: Maintain and troubleshoot equipment used in the energy, environment, and utilities industry.

Unit 3: Gaseous Emissions and Environmental Impact

Essential Question 1:

- How do different types of gaseous emissions contribute to air pollution, and what are the health and environmental effects associated with exposure to these emissions?

Essential Understanding 1:

- Different types of gaseous emissions, such as nitrogen oxides (NOx), sulfur oxides (SOx), carbon monoxide (CO), and volatile organic compounds (VOCs), are significant contributors to air pollution. Exposure to these emissions can lead to adverse health effects and environmental damage.
    - Example: Nitrogen oxides (NOx) released from vehicle exhaust contribute to the formation of ground-level ozone and fine particulate matter (PM2.5). Prolonged exposure to these pollutants can lead to respiratory illnesses like asthma and worsen existing cardiovascular conditions.

Assessment:

- Air District Lab Visit Pre-brief and Debrief Assignment
- Midterm Exam

Objectives & Standards:

Lesson 1: Preparation for Field Trip

- Career Ready Practice 9: Work productively in teams while integrating cultural and global competence.
- CTE 3.4: Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
- CTE 7.7: Demonstrate the qualities and behaviors that constitute a positive and professional work demeanor, including appropriate attire for the profession.

Lesson 2: Air District Lab Field Trip

- CTE 3.4: Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
- CTE 7.7: Demonstrate the qualities and behaviors that constitute a positive and professional work demeanor, including appropriate attire for the profession.

Lesson 3: Debrief and Midterm

- Understand the different types of gaseous emissions, recognize the harmful effects of gaseous emissions Science and Engineering Practices (SEP 8).
- Evaluate types and characteristics of gaseous emissions (e.g., NOx, SOx, CO, VOCs), Science and Engineering Practices (SEP 8).
- Analyze health and environmental effects of gaseous emissions, Reading Standards for Informational Text (11-12.9).

Unit 4: Energy Efficiency and Conservation

Essential Question 1:

- What are the key principles of energy efficiency and conservation, and how can we apply them to reduce energy consumption?

Essential Question 2:

- How can energy audits and assessments help identify opportunities for energy savings, and what factors affect energy usage in various settings?

Essential Understanding 1:

- Energy efficiency and conservation are essential strategies to reduce energy consumption, lower greenhouse gas emissions, and minimize the environmental impact. These principles involve optimizing energy use, reducing waste, and adopting sustainable practices.

Essential Understanding 2:

- Energy audits and assessments involve a systematic evaluation of energy use patterns, identifying areas for improvement, and providing data-driven insights into energy-saving opportunities. Factors affecting energy usage may include building design, equipment efficiency, insulation, and occupant behavior.

Assessment:

- "Energy Audit Report" - Students will conduct an energy audit of their school and produce a report outlining energy usage patterns, inefficiencies, and opportunities for improvement.

Objectives & Standards:

Lesson One: Carbon in My Life

- Understand the importance of energy efficiency and conservation, recognize factors affecting energy usage, and evaluate the effectiveness of various energy-saving strategies, Science and Engineering Practices (SEP 8).
- Understand fundamentals of energy efficiency and conservation, Science and Engineering Practices (SEP 8).
- Identify renewable energy sources and understand distributed generation, Crosscutting Concepts (CC5): Energy and matter: flows, cycles, and conservation.

Lesson Two: Our Behavior, Systems and Emissions

- Analyze energy audits and assessments, Science and Engineering Practices (SEP 8).
- Identify components and understand the impact of energy management systems and building codes, Science and Engineering Practices (SEP 8).

Unit 5: Data Fluency

Essential Question 1:

- How does data tell a story about the past and present levels of pollutants in our atmosphere?

Essential Understanding 1:

- Reading data tables or graphical representations and understanding trends and patterns in the data

Assessment:

- Students create a comparative analysis in which they evaluate air quality data of two different time periods and/or locations to explain their significance.

Objectives & Standards:

Lesson One: Introduction to Reading Data

- Students will analyze air quality data from federal, state, and local sources to identify trends and patterns in pollutant levels over time.

Lesson Two: Data Fluency

- Students will interpret data tables and graphical representations to understand the historical and current levels of pollutants in the atmosphere.

Lesson Three: Comparing Data

- Students will create a comparative analysis of air quality data from two different time periods and/or locations, evaluating the significance of changes in pollutant levels and their implications for environmental policy and public health.

Unit 6: Project Development and Presentation

Essential Question 1:

- What is pollution and how can we inform our communities about the sources and impacts of pollutants?

Essential Understanding 1:

- Understand the primary sources of particulate and gaseous emissions and their health impacts

Assessment:

- Oral presentation and written report requirements

Objectives & Standards:

Lesson One: Evaluating PSAs

- Create a PSA addressing an air quality issue, Writing Standards (11-12.7): Conduct short as well as more sustained research projects to answer a question or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Lesson Two: Research, Planning & Preparation

- Apply principles of clean air technology and sustainability, Crosscutting Concepts (CC5): Energy and matter: flows, cycles, and conservation.
- Synthesize information from multiple sources on clean air technology and sustainability, Reading Standards for Informational Text (11-12.9): Draw evidence from literary or informational texts to support analysis, reflection, and research.
- Create an oral presentation adhering to written report requirements, Writing Standards (11-12.4): Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

Lesson Three: Delivering PSA Presentations

- Synthesize information from multiple sources on clean air technology and sustainability, Reading Standards for Informational Text (11-12.9): Draw evidence from literary or informational texts to support analysis, reflection, and research.
- Create an oral presentation adhering to written report requirements, Writing Standards (11-12.4): Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

Course Title: 200 Environmental Technology

Course Description: Environmental Technology is a course that explores the various aspects of air pollution, including the different types and sources of emissions, as well as the engineering challenges associated with controlling and mitigating their impacts. The course covers topics such as the characteristics of major air pollutants, their effects on human health and the environment, and the regulations and technologies used to control them. Students will also have the opportunity to visit local industries and generators to gain hands-on experience and insight into real-world environmental management practices. Through this course, students will develop an understanding of the complex relationships between human activities, air quality, and the environment, and be equipped with the knowledge and skills needed to address these issues in their future careers.

Unit 1: Greenhouse Gas Control Technologies
Essential Question 1: ● How do greenhouse gasses contribute to climate change, and how can various technologies help control their impact?
Essential Understanding 1: ● Greenhouse gasses, including carbon dioxide (CO2), methane (CH4), and water vapor, trap heat in the Earth's atmosphere, leading to climate change. Human activities, such as burning fossil fuels and deforestation, significantly increase greenhouse gas emissions.
Assessment: ● "Climate Change Myths" - Students will create a TikTok debunking a climate change myth
Objectives & Standards: ● Understand the concept of greenhouse gasses and climate change, recognize the impact of human activities on greenhouse gas emissions, and evaluate the effectiveness of various greenhouse gas control technologies, Science and Engineering Practices (SEP 8). ● Understand the causal relationship between greenhouse gasses and climate change, Crosscutting Concepts (CC2): Cause and effect: mechanism and explanation. ● Understand the impact of greenhouse gas emissions on the environment and society, Reading Standards for Informational Text (11-12.9). ○ Understand the impact of greenhouse gas control technologies (e.g., carbon capture and storage, methane capture, renewable energy), Science and Engineering Practices (SEP 6). ○ Research case studies of successful greenhouse gas reduction strategies, Reading Standards for Informational Text (11-12.9).

Unit 2: Gaseous Emissions Control Technologies

Essential Question 1:

- What strategies and technologies have proven effective in reducing gaseous emissions, and what can we learn from case studies of successful gaseous emission reduction efforts?

Essential Understanding 1:

- Effective gaseous emission control technologies, including catalytic converters, absorption systems, and combustion modification, play a crucial role in reducing air pollution. Case studies of successful gaseous emission reduction strategies provide valuable insights into mitigating environmental and health impacts.
    - Example: The implementation of catalytic converters in automobiles has significantly reduced the emission of harmful gasses like carbon monoxide (CO) and nitrogen oxides (NOx). Case studies from cities with widespread adoption of catalytic converters demonstrate improved air quality and decreased hospital admissions due to respiratory problems.

Assessment:

- Monitor emissions from vehicles of various model years and analyze the results to determine the effectiveness of catalytic converters

Objectives & Standards:

- Understand impact of gaseous emission control technologies (e.g., catalytic converters, absorption systems, combustion modification), Science and Engineering Practices (SEP 6).
- Research case studies of successful gaseous emission reduction strategies, Reading Standards for Informational Text (11-12.9).
- Reflect on the effectiveness of the solutions presented in the case study

Unit 3: Sustainable Transportation

Essential Question 1:

- *How can alternative fuel vehicles (AFVs) and sustainable transportation policies contribute to reducing transportation-related air pollution, and what are the benefits and challenges associated with their adoption?*

Essential Understanding 1:

- Alternative fuel vehicles (AFVs) have the potential to reduce transportation-related air pollution by decreasing emissions of harmful pollutants.

Assessment:

- "Alternative Fuel Vehicle Research" - Students will research and compare alternative fuel vehicles (AFVs), including their advantages, disadvantages, and environmental impact.

Objectives & Standards:

- Understand the different types of alternative fuel vehicles, recognize the benefits and challenges of AFVs, and evaluate the effectiveness of policies promoting sustainable transportation, Science and Engineering Practices (SEP 8).
- Identify different types of transportation-related air pollution, Science and Engineering Practices (SEP 8).
- Understand the impact of alternative fuel vehicles (e.g., electric, hybrid, hydrogen fuel cell), Science and Engineering Practices (SEP 8).

Unit 4: Technical Careers in the Field

Essential Question 1:

- What role do government and industry technicians play in monitoring and protecting air quality?

Essential Understanding 1:

- Government agencies, such as the Environmental Protection Agency (EPA) in the United States, set up air quality monitoring stations to track pollutant levels in the atmosphere. These stations measure concentrations of various pollutants, such as particulate matter, ozone, nitrogen dioxide, and carbon monoxide. Industry technicians also monitor emissions from industrial sources, vehicles, and other sources to ensure compliance with regulations.

Assessment:

- Canva or paper poster on specific jobs in the industry

Objectives & Standards:

- Explain the role of government agencies, such as the EPA, in monitoring and regulating air quality, including the purpose and function of air quality monitoring stations.
- Describe the different types of pollutants measured by air quality monitoring stations, their sources, and their potential health and environmental impacts.
- Analyze data collected by air quality monitoring stations and industry technicians to evaluate compliance with air quality regulations and identify areas for improvement in reducing emissions and improving public health.

Unit 5: Local Industrial Controls

Essential Question 1:

- How do local industries and pollution generators monitor and control their emissions?

Essential Understanding 1:

- Pollution generators use a variety of methods including continuous monitoring, sampling, and mathematical tools such as emission factors to monitor their emissions. They will use employee training, emissions reduction plans, and accountability measures to ensure that emissions are kept at an appropriate level

Assessment:

- Notes and data-collection from on site field trips

Objectives & Standards:

- Students will be able to identify and describe the sources of emissions from various industrial activities, including those associated with energy production, transportation, and manufacturing, through field observations and measurements during site visits.
- Students will understand the importance of monitoring and managing emissions from pollution generators, and be able to explain the purpose and function of different types of air quality monitoring equipment and techniques used in the field, such as ambient air quality monitors, personal air samplers, and remote sensing technologies.
- Through job shadowing experiences with professionals working in the field of air quality management, students will gain insight into the daily tasks and responsibilities involved in monitoring and controlling emissions from pollution generators, including data collection, analysis, and reporting, as well as communication with stakeholders and policymakers.

Unit 6: Project Development and Presentation

Essential Question 1:

- How can clean air technology be applied to monitor and control emissions at a local generator?

Essential Understanding 1:

- Individuals as well as organizations work to meet government regulations by monitoring and managing emissions using specific technologies.

Assessment:

- Presentation on emissions controls at a local industrial site

Objectives & Standards:

- Create a project proposal addressing an air quality issue or challenge, Writing Standards (11-12.7): Conduct short as well as more sustained research projects to answer a question or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- Apply principles of clean air technology and sustainability, Crosscutting Concepts (CC5): Energy and matter: flows, cycles, and conservation.
- Synthesize information from multiple sources on clean air technology and sustainability, Reading Standards for Informational Text (11-12.9): Draw evidence from literary or informational texts to support analysis, reflection, and research.
- Create an oral presentation adhering to written report requirements, Writing Standards (11-12.4): Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

Course Title: 250 Conservation & Environmental Justice

Course Description: Conservation & Environmental Justice is the cornerstone course in the Air Quality Control Pathway within the Career and Technical Education (CTE) program. This course provides students with a comprehensive understanding of the history, objectives, frameworks, and diverse career pathways within the fields of conservation and environmental justice at local, state, and federal levels. Students will examine the disproportionate impacts of climate change on various communities, explore the historical and contemporary roles of advocacy groups and public institutions, and evaluate employment prospects and lifestyle considerations in this sector. Additionally, the course will delve into concepts of energy efficiency and sustainability as they relate to clean air technology.

Unit 1: The Argument for Conservation & Environmental Justice
Essential Question 1: ● What is Environmental Justice and why is it an important movement? **Essential Question 2:** ● What is the relationship between race, gender, class, and climate change?
Essential Understanding 1: ● Environmental Justice addresses the intersection of social equity and environmental sustainability, emphasizing the need to protect communities disproportionately impacted by environmental challenges.
Assessment: ● Create an Environmental Justice Mission Statement.
Objectives & Standards: Lesson 1: Defining Environmental Justice ● Students will understand the concept of environmental justice and its significance in addressing environmental issues. ● Students will analyze examples of environmental justice issues presented in the reading "Environmental Warriors: Going to the Root of the Problem" from "When We Fight We Win!" Lesson 2: Data Story ● Students will analyze census block data to identify trends and patterns in race, class, gender, and health outcomes. ● Students will explore the relationship between land use issues, redlining, and strategic segregation and their impacts on environmental justice. Lesson 3: ● Students will be able to articulate the principles of environmental justice, including equity, fairness, and community involvement. ● Students will create a poster, flow chart, or other visual art piece that synthesizes their understanding of environmental justice and the relationship between race, gender, class, and climate change.

Unit 2: History of the Conservation & Environmental Justice Movement

Essential Question 1:

- How has the conservation and environmental justice movement concerning clean air evolved over time in the United States?

Essential Understanding 1:

- Initially, efforts to address air pollution focused primarily on regulatory approaches and technological solutions. In the mid-20th century, landmark legislation such as the Clean Air Act laid the groundwork for emissions controls and air quality standards, marking a pivotal shift towards governmental intervention.As awareness of environmental justice issues grew, particularly in marginalized communities disproportionately affected by air pollution, the movement expanded to incorporate principles of equity and social justice. Community activists and grassroots organizations played a crucial role in advocating for the fair distribution of environmental benefits and burdens, challenging discriminatory practices such as siting polluting industries in low-income neighborhoods.Efforts to address air pollution now encompass broader strategies that consider not only technological innovations but also community engagement, public health considerations, and sustainable development practices.

Assessment:

- Create a Case Study of an historical clean air event

Objectives & Standards:

Lesson 1: From Crisis to Regulation: The Evolution of Air Quality Laws

- Students will analyze primary and secondary sources to explore the history of air quality regulations, including the progression from catastrophic pollution events to regulatory interventions.
- Students will examine the Clean Air Act as a case study, understanding its historical significance and impact on air quality management.
- Students will understand the historical context of air quality regulations (RI 11-12.7)

Lesson 2: Historic Smog Events: Catalysts for Change

- Students will research and analyze historical air pollution events, such as the Great Smog of London or the Donora Smog, to understand their causes, consequences, and role in shaping air quality regulations.
- Students will examine the relationship between historical pollution events and the development of regulatory frameworks and policy responses.
- Students will analyze specific pollution events to identify key factors influencing regulatory decisions and policy outcomes.
- Students will create a case study of a specific pollution event, analyzing its impact on policy

Unit 3: National, State, & Local Air Quality Policy

Essential Question 1:

- What is the policy landscape? How is policy created, implemented, and enforced at the local, state, and national levels?

Essential Understanding 1:

- Air quality policy is shaped by a multi-tiered system of governance, where national, state, and local agencies collaborate and address unique challenges. Effective policy creation, implementation, and enforcement depend on the interplay of legislation, regulatory agencies, and community engagement to achieve public health and environmental goals.

Assessment:

- Students Select One Policy- Create Agency Flowchart

Objectives & Standards:

Lesson 1: National Policy

- Students will examine the development, evolution, and impact of national air quality policies and regulations.
- Students will assess the effectiveness of national policies in addressing air quality issues and promoting public health and environmental protection.

Lesson 2: State Policy

- Students will investigate state-level air quality policies, legislation, and initiatives.
- Students will analyze the role of state governments in addressing air quality challenges and implementing regulatory measures, such as the California Air Resources Board (CARB)

Lesson 3: Local Policy

- Students will research local air quality policies, ordinances, and initiatives.
- Students will examine the role of local governments agencies, such as the Sacramento Metropolitan Air Quality Management District, and communities in addressing air quality concerns and implementing pollution control measures.

Unit 4: The Environmental Justice Airspace

Essential Question 1:

- Which agencies and institutions in Sacramento work to support air quality control?

Essential Understanding 1:

- Students will understand the roles and functions of various agencies and institutions in Sacramento dedicated to supporting air quality control, environmental justice, and community advocacy.

Assessment:

- Student Created Midterm Exam

Objectives & Standards:

Lesson 1: Field Trip Pre-brief

- identify and describe the roles, missions, and key initiatives of the agencies, organizations, and institutions they will visit during the field trip.
- explain key concepts related to air quality control and environmental justice, including their significance and relevance to their lives and communities.
- follow safety protocols, adhere to behavior guidelines, and demonstrate respectful behavior during the field trip.

Lesson 2: Field Trip

- evaluate the regulatory framework, monitoring techniques, research initiatives, and community outreach efforts related to air quality through participation in guided tours, presentations, and discussions.
- analyze insights gained from professionals, activists, and experts during the field trip to develop a nuanced understanding of air quality control and environmental justice issues.

Lesson Three: Debrief

- identify key insights, impressions, and questions related to air quality control and environmental justice.
- compare the roles and contributions of different agencies, organizations, and institutions visited during the field trip in addressing air quality and environmental justice issues.
- articulate connections between their field trip experiences and classroom learning, identifying how real-world examples relate to theoretical concepts.
- synthesize their reflections, observations, and discussions to generate comprehensive insights and draw conclusions about the importance of community engagement and advocacy in promoting air quality control and environmental justice.

Unit 5: Environmental Warriors in Air Quality Control

Essential Question 1:

- Who are the key advocates and organizations championing air quality control today, and how do their efforts shape policy, innovation, and community action?

Essential Question 2:

- What advocacy opportunities, roles, and responsibilities exist within the air quality control sector across national, state, and local levels, and how do they promote equity and environmental justice?

Essential Understanding 1:

- Advocacy plays a pivotal role in advancing air quality control by driving policy changes, fostering community engagement, and promoting technological innovation. Environmental warriors—individuals and organizations—work across national, state, and local levels to address air quality challenges, champion equity, and inspire interdisciplinary collaboration for sustainable solutions.

Assessment:

- Research a career opportunity in Air Quality Control you might be interested in pursuing to create a 5Q's career profile.

Objectives & Standards:

- identify and describe prominent individuals and organizations in the field of air quality control today.
- analyze the roles and responsibilities of environmental professionals and advocates in addressing air quality issues.
- explore the diverse career opportunities available within the air quality control sector at national, state, and local levels.
- assess the impact of technological advancements and innovations on air quality control efforts.
- discuss the importance of interdisciplinary collaboration and community engagement in achieving air quality goals.

Unit 6: Advocacy in Action: Crafting Policy for Environmental Equity
Essential Question 1: ● How do Environmental Warriors advocate for equitable environmental policies, and what strategies do they use to influence change at governmental and grassroots levels?
Essential Understanding 1: ● Environmental Warriors leverage advocacy, policy development, and community engagement to promote equitable environmental changes. Their efforts span governmental and grassroots levels, utilizing strategic action to address air quality challenges and foster sustainability.
Assessment: ● GRASPS Performance Task: Assume the role of a current Environmental Warrior in the field or Air Quality Control. Work to create a proposal, policy, policy critique, or local environmental plan.
Objectives & Standards: ● Create a project proposal addressing an air quality issue or challenge, Writing Standards (11-12.7): Conduct short as well as more sustained research projects to answer a question or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. ● Apply principles of clean air technology and sustainability, Crosscutting Concepts (CC5): Energy and matter: flows, cycles, and conservation. ● Synthesize information from multiple sources on clean air technology and sustainability, Reading Standards for Informational Text (11-12.9): Draw evidence from literary or informational texts to support analysis, reflection, and research. ● Create an oral presentation adhering to written report requirements, Writing Standards (11-12.4): Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

Course Title: 300 Environmental Policy & Advocacy

300 Course Description: This pathway course offers students an immersive exploration into environmental policy and air quality control. Throughout the course, students engage in a project based learning experience to understand the complexities of addressing a local air quality issue. One key component of the course is the opportunity for internships with local air quality control institutions, providing practical experience and networking opportunities. The course culminates in a Defense of Learning presentation, in which students reflect on their internship experiences, their learning throughout the pathway, and visualize their future participation in this career sector. By the end of the course, students gain a comprehensive understanding of environmental policy concepts and are equipped with the skills to contribute meaningfully to air quality control efforts in their communities.

Unit 1: PBL Introduction to Environmental Policy
Essential Question 1: ● How can we address a local air quality issue using the skills that we have acquired over the course of this pathway?
Essential Understanding 1: ● Solving air quality issues requires the cooperation of various entities, including the government, the public, and businesses. Environmental policy-makers must consider the costs, benefits, and needs of these groups as well as weigh the future cost on our ecosystem and public health. They must also argue persuasively to move policy through legislative bodies.
Assessment: ● Presentation explaining and proposing a policy change to address an air quality issue in the region
Objectives & Standards: ● Students will communicate scientific information from collected data in multiple formats (including orally, graphically, textually, and mathematically). (NGSS SEP.6.9-12.4) ● Students will gather relevant information on their air quality issue from multiple authoritative sources and integrate it into their project (CCSS.ELA-LITERACY.W.9-10.8)

- Students will write an informative/explanatory text to accurately communicate the scope and details of the air quality issue they have chosen. (CCSS.ELA-LITERACY.W.9-10.2)
- Students will write arguments to support a specific policy change using valid reasoning and relevant and sufficient evidence (CCSS.ELA-LITERACY.W.9-10.1)

Unit 2: Internship or Job Shadow

Essential Question 1:

- How can participating in a job shadow experience at a chosen air quality control institution in Sacramento deepen our understanding and prepare us for careers in the field?

Essential Understanding 1:

- Students will gain firsthand insights into the roles, responsibilities, and operations of air quality control institutions through participation in a job shadow experience, enhancing their preparation for careers in the field.

Assessment:

- Internship/ Job Shadow Reflection to be included in Portfolio and Defense of Learning Presentations

Objectives & Standards:

- Students will select and research a chosen air quality control institution in Sacramento to identify potential job shadow opportunities and learn about its mission, activities, and organizational structure.
- Students will actively participate in a job shadow experience at their chosen air quality control institution, observing and engaging with professionals to gain insights into their day-to-day responsibilities, projects, and challenges.
- Students will reflect on their job shadow experience through a written and oral report, analyzing their observations, insights, and learning outcomes, and articulating how the experience has deepened their understanding of air quality control concepts and prepared them for future careers in the field.

Unit 3: Portfolio Presentations

Essential Question 1:

- How can we demonstrate our mastery of air quality control concepts and skills through a comprehensive "defense of learning" presentation?

Essential Understanding 1:

- Students will synthesize their knowledge, skills, and experiences gained throughout the two-year air quality control CTE pathway to develop a comprehensive defense of learning presentation.

Assessment:

- Portfolio Presentations

Objectives & Standards:

- Students will gather and evaluate a variety of resources, documents, and artifacts related to air quality control, including research papers, case studies, project reports, and fieldwork observations.
- Students will analyze and synthesize the information gathered to identify key themes, trends, and insights in air quality control, highlighting their understanding of foundational concepts and real-world applications.
- Students will design and deliver a "defense of learning" presentation that effectively communicates their mastery of air quality control concepts and skills, incorporating evidence-based arguments, visual aids, and multimedia elements to support their claims.