STEAM Education & Leadership Workshops:

Lesson Plan - Understanding the Air We Breathe: Air Pollution & Air Quality Index (AQI)

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Age range

9-12 years old

Learning objectives

By the end of this lesson, Students will be able to:

- ☑ Understands the concept of air pollution and identifies major air pollutants and their sources.
- ☑ Explain the Air Quality Index (AQI), including its colour coding, categories, and health implications.
- ☑ Analyse and compare real AQI data from different Indian cities to identify patterns and possible causes.
- ☑ Develop critical thinking by connecting air quality data with geography, weather, and human activities.
- ☑ Build social awareness and empathy by recognising how air pollution affects different groups within their community.
- ☑ Demonstrate responsible decision-making by identifying personal actions they can take to improve air quality.

Structure of the lesson

- **Introduction & Emotional Connection**: Mindful breathing exercise and visual comparison of clean and polluted air to connect physical experience with environmental observation.
- **Concept Building – Air Pollution**: Explanation of air pollution, types of pollutants, and sources using visuals and real-life examples.
- **Concept Building – Air Quality Index (AQI)**: Introduction to AQI scale, colour coding, categories, and health implications.
- **Guided Practice & Data Analysis**: Case study using real-time AQI data from Indian cities to interpret, compare, and reason about variations in air quality.
- **Social Awareness & Community Connection**: Small group discussions on local sources of air pollution and its impact on different community members.
- **Reflection& Commitment**: Student reflection on personal actions to improve air quality and foster ethical citizenship.

Duration

90 Minutes

Note to Educators

This lesson is designed to integrate STEAM learning with whole-child development, helping students connect scientific concepts to real-world contexts and human experiences. Through observation, data

analysis, discussion, and reflection, students engage in scientific inquiry, critical thinking, and systems thinking while also developing self-awareness, empathy, and responsible decision-making.

- Encourage open discussion, student voice, and lived experiences without judgment.
- Use local and familiar examples to make learning relevant and meaningful.
- Focus on building awareness, compassion, and civic responsibility rather than overwhelming students with technical details.
- Affirm all student contributions and emphasise that small, consistent actions, when taken collectively, can lead to positive environmental, social, and community change.

Resources

- **Slides**: *Understanding the Air We Breathe: Air Pollution &* Air Quality Index (AQI)

Timing	Facilitator's actions	Students outcomes	Technical notes
15 Mins	**Introduction and Emotional Wellbeing Connection**: • The facilitator begins the session with a short breathing exercise, asking students to sit comfortably and take slow, deep breaths. Students are then asked to reflect on whether their breathing feels **light or heavy**. • The facilitator displays two images of the same place taken on different days, one showing clean air and the other showing polluted air. Students are guided to observe the images and respond to the following questions: ○ *What differences do you notice between these two photos?* ○ *Which day do you think had cleaner air, and why?* ○ *What clues in the photo helped you decide?*	**Awareness, Connectedness, and Wellbeing** Focus: Safety, Foundational Knowledge, Global mindedness, perspective taking and Identity. Students participate in a guided breathing exercise and reflect on whether their breathing feels light or heavy. They carefully observe and compare images of clean and polluted air, identifying visible differences such as clarity, haze, and visibility. Students use visual clues to infer which day had cleaner air and justify their reasoning. Students connect their physical experience of breathing with visual evidence of air quality, setting the context for learning about air pollution and the Air	Display high-quality images of the same location taken on different days (one with clean air and one with visible pollution). Ensure images are clear and projected or printed in colour for easy comparison. Allow sufficient pause time during the breathing exercise and discussion. Avoid giving correct answers immediately; encourage student observation and

		Quality Index. Through discussion, students begin to make connections between air quality, physical sensations while breathing, and environmental conditions, building curiosity and readiness to learn about air pollution and AQI.	reasoning. If possible, use local or familiar locations to increase relevance.
15 Mins	**Concept Building – Air Pollution** • The facilitator explains the concept of air pollution using simple visuals, describing it as the presence of harmful substances in the air we breathe. • Through images and icons, the facilitator introduces major types of air pollutants, including particulate matter (PM2.5 and PM10) and common gases released from vehicles and industries. • Visuals of traffic, factories, burning waste, and construction sites are used to help students identify key sources of air pollution. • Throughout the explanation, the facilitator links each pollutant to its source, ensuring students understand how everyday human activities contribute to air pollution.	**Mastery and Connectedness** Focus: Global mindedness, critical thinking and social awareness. Students observe the visuals and listen to the explanation of air pollution. They identify different types of pollutants shown in the images and name common sources such as vehicles, factories, burning waste, and construction activities. Students respond to guiding questions by linking pollutants to their sources and begin to understand how human activities affect air quality. Through visual support, students demonstrate improved conceptual clarity and actively participate by sharing examples from their surroundings	Use clear and age-appropriate visuals to explain concepts. Display images or icons representing different pollutants and their sources. Use local and familiar examples wherever possible to strengthen connections.
15m Mins	**Concept Building – Air Quality Index (AQI)** • The facilitator introduces the Air Quality Index (AQI) as a scale used to measure the air quality on a given day. • Using a visual AQI chart, the facilitator explains the colour coding and categories, starting	**Mastery and Connectedness** Focus: Global mindedness, critical thinking and social awareness. Students observe the AQI chart and actively listen to the explanation of the AQI scale. They identify different AQI colours and categories and explain	Display a clear and colour-coded AQI scale that is large enough for all students to see. Use your local AQI categories for consistency.

	from Green (Good) air quality to Red/Maroon (Poor to Severe) air quality. • Each category is briefly linked to its meaning and possible health effects, helping students understand that higher AQI values indicate more polluted air and greater health risks. • The facilitator emphasises how AQI helps people decide daily activities such as outdoor play, travel, and mask usage.	what each colour represents in terms of air quality and health impact. Students respond to questions by correctly linking higher AQI values with poorer air quality. Through discussion, they demonstrate an understanding of how AQI information can influence daily decisions such as outdoor activities and health precautions.	Explain colours in sequence from low to high AQI values. Avoid overloading students with numbers; focus on meaning and health impact. Pause to check understanding using quick oral questions.
20mins	**Guided Practice & Data Analysis** • The facilitator presents real-time AQI data from different cities as a short case study. • The facilitator explains which city's AQI falls in the **Very Poor/Hazardous** range, while which other cities show **Poor** air quality, and asks guiding questions such as: ○ *Which city has the worst air quality?* ○ *What differences do you notice across cities?* ○ *Why do you think air quality varies from one city to another?* • The facilitator highlights how factors like geography, weather, traffic, industries, and local activities influence air quality, helping students connect data with real-world conditions.	**Mastery and Agency** Focus: Critical thinking, collaboration, creativity and Innovation. Students observe and interpret real AQI data from different cities. They compare AQI values and correctly identify cities with higher and lower air pollution levels. Students respond to guiding questions by discussing visible differences in air quality categories and suggesting possible reasons for variation, such as traffic density, industrial activity, weather conditions, and geography. Through this data-based discussion, students develop skills in reading real-world data and connecting it to environmental and human factors.	Use recent or printed AQI data from reliable sources and present it in a simple table or chart. Highlight AQI values and corresponding colour categories clearly. Avoid excessive numbers; focus on comparison and interpretation. If live data is unavailable, use the provided case study as a substitute.
15mins	**Social Awareness & Community Connection** • The facilitator divides students	**Awareness, Connectedness, Agency** Focus: Social Awareness,	Arrange students into small groups of 4–5.

	into small groups and prompts them to discuss local causes of air pollution in their surrounding area. Ask guiding questions- • *What activities in our neighbourhood contribute to air pollution?* • *What sources of air pollution do you see around your home or school?* • *When does the air feel worse, morning, afternoon, or evening? Why?* • *Which activities create smoke, dust, or bad smells in your area?* • *Who is most affected by this pollution (children, elderly, workers)?* The facilitator moves between groups, listens to student ideas, and encourages them to connect pollution sources to daily human activities such as traffic, construction, waste burning, and industrial work.	collaboration, Students actively participate in small group discussions and identify local sources of air pollution based on their surroundings. They share examples such as vehicle emissions, construction dust, burning of waste, use of generators, and nearby industries. Students listen to different perspectives within their groups and build on each other's ideas. Through discussion, they demonstrate an increased awareness of how everyday activities in their community contribute to air pollution.	Display or write guiding questions clearly on the board. Allocate a fixed time for discussion and signal when the time is almost over. Move around the classroom to facilitate rather than lead discussions. Encourage all students to participate and keep the discussion focused on local, observable causes.
10mins	**Reflection and Commitment** • As a part of nurturing students to become responsible and empathetic individuals, the facilitator invites students to reflect on their role in improving air quality. • The facilitator asks students to share one simple action they can personally take to reduce air pollution.. • The facilitator affirms all responses and emphasises that small individual actions, when practised consistently, can lead to meaningful collective change.	**Wellbeing, Mastery, Agency.** Focus: Gratitude, Sense of Belonging, Empathy, Problem-solving Students reflect on their personal habits and share one action they can take to help improve air quality. They suggest practical steps such as reducing vehicle use, not burning waste, saving electricity, planting trees, or spreading awareness among family and peers. Through this reflection, students	Create a safe and non-judgmental space for sharing. Allow voluntary participation and respect all responses. Keep actions realistic and age-appropriate. Avoid preaching; focus on encouragement and affirmation.

	This activity helps students connect environmental learning with personal responsibility and ethical citizenship.	demonstrate a sense of responsibility and empathy towards their environment and community, showing an understanding that individual actions contribute to collective well-being.	