

SUBJECT AREAS:

Technology

ACTIVITY DESCRIPTION:

Collaboration and teamwork, communication, researches, critical thinking and problem solving, creativity and imagination.

OBJECTIVES:

- Identify some of the major causes, effects, and sources of air pollution.
- Define the Air Quality Index (AQI).
- Explain the properties of air
- Describe the role of engineers and technology in addressing air pollution.
- Explain how air pollutants affect atmospheric temperature, human health

MATERIALS:

Projector and screen for group discussion and content display, tablets or computer with internet access, notebooks, pens.

GRADE/LEVEL:

Secondary school (15-18)

DURATION:

Preparation time: 30 min.
Activity time: 45 min.

PLACE:

Classroom

AUTOR:

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What's Air Got to Do with It? Properties & Quality

INTRODUCTION:

Most of the time, we hardly notice the air around us. We cannot usually see it or taste it. Air does not usually smell (but it does carry substances that we do smell). However, you can feel air when it moves and you can see the effects of air on your surroundings. When air moves, it has great power (to push sailboats, drive windmills, and move clouds), and when it is compressed (squashed into a small space), it has great strength (air in a tire supports a vehicle and helps a helicopter to rise into the air). We must have air to survive. Because of this, engineers work to solve our air pollution problems. There are many things that complicate these solutions, so engineers who work on air pollution problems must have a firm understanding of the composition, properties and behavior of air in order to develop air pollution prevention and clean-up techniques and technologies.

BACKGROUND:

Long ago, people were not worried about clean air because we seemed to have an endless supply. Today, many more people live in our world, and we are rapidly polluting this essential resource which is contributing to climate change. We need to find better ways to protect and improve our air.

In this unit, students consider what air pollution is, its sources, the impact it has on us and our environment, and ways to prevent and clean it up. Engineers and technology play an integral role in the problems and solutions of air pollution.

Procedure:

Students begin with this lesson to develop their understanding of the composition and properties of air as well as some general definitions and awareness of air quality.

The teacher will use this short time (5-10 minutes) to explain the steps for this activity

- Make as many copies of the list of questions from Chapter 1 as necessary and distribute them to each student separately. Each student should individually complete the questionnaire in 5-10 min. and give their own thoughts on the given question.

Then the teacher together with the students can discuss each question, present the different understandings and prior knowledge that the students have.

- The teacher presents the new information during the discussion by asking the following questions:
What Are Air Pollutants? How Do Air Pollutants Affect Us?
- Next teacher can divide students into several groups. Ask them the following questions and spark your students' curiosity:
Before you head outside, how is the air quality? Do you know how to make sure the air is clean enough to work or play outside?

- Assign the students to open the next page: <https://www.igair.com/world-air-quality>
Then assign each group to the website to find one city in which we have the most polluted, moderately polluted and clean air.

Help students understand the difference in a numerical scale used to indicate air quality, based on the measurement of particulates or other pollutants.

- In the next step, each group will present their assignment to the class. The presentation can begin by asking the question What Color is Your Air Today?
- The teacher will initiate a discussion about what is the reason for the difference in the obtained air pollution values and how does technology today help or harm us in improving air quality? *What Are Air Pollutant Solutions? Who Cares? Why Do We Need Pollution Solutions?*

FUN FACTS:

- *In 1992, the United Nations declared Mexico City to be the world's most polluted city. When pollution was really bad, birds were known to drop dead out of the sky. As of 2019, the world's most polluted city was Ghaziabad, India.*
- *Every day, each of the world's 987.5 million cattle (as of 2020) gives off 250-500 liters of methane (produced in their gut as they digest food). Methane is also produced in large quantities by rotting vegetation in landfills and by the production and transport of coal, natural gas, and oil. Methane is a very potent greenhouse gas; it contributes readily to the increasing temperature of our earth's atmosphere.*
- *The average person takes about 20,000 breaths a day.*
- *Even though plants make oxygen, which is essential to live, humans have destroyed almost half of the original forests on Earth. As of 2020, only one-fifth of the Earth's original forests remain pristine and undisturbed.*

ASSESSMENT:

Each student should do the following task:

Use the website <https://www.igair.com/world-air-quality> to quickly find your local air quality.

- To access the information, you must enter the name of the city or search for the city on the map that you want to research;
- Find your place of residence and two other locations to compare the information obtained;
- Fill in the table (Chapter 2) with the information requested about your location and others you are curious about;
- Send the completed table to your teacher.

EVALUATION:

The evaluation of student's success and the attainment of their results is done by:

- oral answers to questions in the discussion;
- contribution to group activity;
- contribution to deriving the conclusions;
- answers to a worksheet.

Chapter 1.

Discuss the following questions with the students.

1. Why air is so important to us?

2. Does the quality of our air matter? Is clean air important?

3. How does air get dirty? What is air pollution? What are air pollution sources?

4. What could happen if you breathe polluted air?

5. How do air pollutants affect the earth on a global scale?

Chapter 2.

- Use the website <https://www.igair.com/world-air-quality> to quickly find your local air quality.
- enter into the table the data you see currently displayed on the web page

Name of location	Air quality index (AQI)	Air pollutants (What is the current air quality)	Health recommendations

- Write your thoughts on the following question.

What will the world be like if we do not develop some solutions to our air pollution problems?_____
