सत्यमेव जयते

Ministry of Health and Family Welfare
Government of India

National Centre for Disease Control(NCDC)
Government of India
New Delhi

THE NATIONAL PROGRAM ON CLIMATE CHANGE AND HUMAN HEALTH (NPCCHH)

Training Manual for Community Level Training on Air Pollution and its Impact on Children's Health

National Centre for Disease Control (NCDC),
Directorate General of Health Services (DGHS)

MINISTRY OF HEALTH AND FAMILY WELFARE
GOVERNMENT OF INDIA
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राष्ट्रीय रोग नियंत्रण केंद्र
स्वास्थ्य सेवा महानिदेशालय
स्वास्थ्य एवं परिवार कल्याण मंत्रालय भारत सरकार

National Centre for Disease Control (NCDC)
Directorate General of Health Services (DGHS)
Ministry of Health and Family Welfare
Government of India

डॉ. सुजीत कुमार सिंह
निर्देशक, राष्ट्रीय रोग नियंत्रण केंद्र

Dr Sujeet Kumar Singh
Director, NCDC

Preface

Globally, air pollution is recognised as the greatest environmental risk to human health and a main avoidable cause of death and disability. It also affects disproportionately to health of the children who will become the future building blocks of the nation. Children are very sensitive to air pollution since their inception in the mother womb. As their organs are developing and not fully matured, they are highly vulnerable to air pollution exposure and may develop various ill effects due to air pollution including cardio-respiratory disorders like asthma and other allergic disorders etc. This may hamper their health in the later adult life also. So, it is very important to address the health effects of the children due to air pollution.

Bringing awareness to the public particularly children on the causes of air pollution, various health outcomes and impacts and the multiple health adaptation mechanisms to protect and prevent from air pollution will enable them in addressing their related health issues.

The Centre for Environmental and Occupational Health, Climate Change and Health (CEOHCCH) division at National Centre for Disease Control, Directorate General Health Services under the Ministry of Health and Family Welfare which looks after the National Program of Climate Change and Human Health (NPCCHH) has developed 'Training manual for community level training on air pollution and its impact on children's health'. The manual has rightly covered the various sources of air pollution, the ways to understand air pollution in a particular area, the health impacts and the various ways to prevent and protect the health of the children in particular. The Training of Trainers (ToTs) based on this manual will be undertaken for officers of the States/UTs under NPCCHH and they will further do training in the States/UTs so that the awareness and desired messages reach the target group.

I am thankful to other partners in developing the present manual including the WHO India and Public Health Foundation of India (PHFI) teams for their full support and cooperation which will be extremely important to address the issue at present and in the coming days.

I am sure that this training manual on community training of air pollution and its impact on children's health will help in successful implementation of the NPCCHH programme.

I commend the efforts of all those who have contributed to making this a much valuable document.

(Sujeet K.Singh)

Director

Contents

About the Manual

Children are more vulnerable to air pollution than adults. The reason is that they are exposed more often to pollutants and because their organs are still in the process of maturing. However, they are usually the least prepared to deal with the challenges of this menace as they do not have the knowledge necessary to do so. Through this manual, children will be introduced to various aspects of air pollution and its effect on their health. As the instructor, your role will be to help them understand the topic, answer their questions, resolve their doubts and lead discussions. You will be provided with a flipchart for students which along with this manual will guide you in conducting class activities. Some of the activities are more crucial to the students' understanding and thus should be conducted in the class under your supervision. There are also other optional activities which you may choose to conduct if time allows. It would be a good idea to go through the contents a day in advance so that you are able to collect all items you need to conduct the activities. (There is additional information in your manual for your own knowledge building. It is not available in the students' manual).

Purpose of this document

An enlightened community is one that is willing to change and take action when required. This manual is designed to inform and empower students and also to help them learn ways to protect themselves from the effects of air pollution and avoid adding to it.

It is necessary to provide accurate information on the sources of air pollution that is relevant to students/children before behavior change can happen. This manual should:

1. Enable teachers and students to understand the importance of information, education and communication (IEC) in promoting health behaviors
2. Serve as a guide for the teachers to share information regarding the dangers of air pollution to children's health
3. Assist as a tool to ensure the consistent delivery of relevant health information during various IEC activities with students as the key targets

Role of Information, Education and Communication (IEC)

- To drive higher level of awareness about the problem of air pollution in rural areas
- Disseminate relevant information to drive health seeking behavior

- To create user-friendly and stand-alone materials that highlight useful knowledge and grass-roots solutions that lead to a better quality of life for the target audience

Guidelines on conducting the session/ classroom discussion

1. **Place and medium of communication**

   The discussion on health effects of air pollution on children/student's health can be conducted in schools or other learning environments

2. **Time commitment of participants**

   The discussion can be completed in an hour of your class time or can be made part of a special assembly on air pollution. The flipchart can be explained to students from Class V and upwards by their teachers. It is best to arrange this session beforehand and encourage active group discussion among the students.

3. 3. During the discussion, the teacher should encourage the students to express their thoughts and opinions. The proper approach for any behavior change communication is to acknowledge different points of view and work towards a common understanding. There should be no bias on the basis of religion, caste, social class or age.

The contents include the following topics:

- Understanding air quality and air pollution
- Introduction to air pollutants
- Outdoor air pollution

- Indoor air pollution
- Air Quality Index
- Air pollution and the respiratory system
- Air pollution and its health effects
- Call to action: Protection from air pollution and reducing it in our own local environment

Tips for Facilitator

1. The facilitator must ensure that everyone in the group has a chance to speak freely and to participate.
2. Acknowledge the responses of the participants and encourage those who remain quiet to take part. It will be best to get everyone to talk. The discussion should not be dominated by a few active and assertive members of the group.
3. The facilitator must speak loudly and clearly when explaining the concepts

General instructions for using the flipchart

Each flipchart page has pictures relating to a particular topic and theme on air pollution. The facilitator should always ask the group to describe the pictures that they see on the front page. The description accompanies these pictures on the opposite page. The structure of the discussion will be free, with the facilitator engaging all students and asking them whether they have had any experience of air pollution. The pictures in the flipchart depict scenes from the everyday life of students; however, some children may have had different experiences altogether and may not relate to the images. Explain the images to them if required.

Objectives of the discussion on air pollution

- To raise the awareness of the participants (students/children) about the importance of clean air
- To increase the understanding of the connection between air pollution and its effects on health
- To increase the understanding of how the negative effects on the body are not temporary, and may lead to serious diseases later in life
- To increase awareness of how air pollution has a greater effect on children than on adults
- To communicate to children that they can take some measures to protect themselves and to reduce air pollution in their own domestic and local environments

Guide for Flipchart Contents

Air Quality and Air Pollution

Objectives:

After you introduce the basic facts and concepts about air pollution, your students will:

- Know what air pollution means
- Understand that air can be polluted even when if it looks clean
- Be aware of the key terms associated with air pollution

Start the class with a group discussion and to encourage the students to think about the subject, give the following prompts:

- What do you understand by air quality?
- Do know what is meant by the expression “air pollution”?
- Do you think the air around you in your school is good quality air or bad?
- What about your home?
- Why do you think so?
- List down the ways in which you recognize that the air around you is polluted.

Do not get into the details of all the exact definitions and answers to these terms just yet. Give the students time to discuss among themselves and guide them in case they do not comprehend the prompts. You can perhaps start with their understanding of the word "quality" and then take it forward from there.

The point of these prompts is to get students into an interactive and responsive mode, so they are more receptive.

As you navigate from one question to another, be sure to note any common misconceptions that the students have so that you can debunk them as you touch upon these aspects in the later chapters.

Air Quality

Now, we introduce the idea of air quality to the students.

Air quality indicates the condition of the air surrounding us. It tells us how clean (or not clean) the air we breathe is.

If there are more than a certain percentage of harmful substances in the air, air quality is said to be bad. These substances are so small that they cannot be seen by the naked eye. If there are very few such harmful substances in the air, we can say that the air quality is good. Air quality helps us decide whether the air is healthy or not.

Here, you need to help the students understand that, like other aspects of nature, air too can get contaminated. Tell them to discuss the list about ways in which air gets polluted. Once they have discussed their responses, ask them to think about the following prompts.

- Can you tell what these harmful substances are made up of?
- Do you know any other term that is used for these harmful substances? (See if any student can guess the term "pollutant" for it.)
- Can you name any of these harmful substances?

You may notice during the discussions about the "harmful substances" that students switch between pollutants and their sources. Note down these points so that you can clarify them in the subsequent discussion .

Air Pollution

Now that the students understand air quality, you can start with asking the students to define air pollution.

- Air pollution is caused when harmful gases, dust, smoke, odours or any toxic substances that adversely affect the environment and health are introduced into the air.
- These harmful substances that cause air pollution are called air pollutants.
- Air pollution is generally divided into two types – indoor and outdoor.
- Indoor air pollution can be defined as the contamination of indoor air by sources like cooking fuel, construction material etc.
- Outdoor or ambient air pollution is the contamination of the air outdoors by "potentially harmful pollutants emitted by industries, households, cars and trucks.

Optional – Read the following short story

There was once a little grey planet that was very sad. The people living on it hadn't looked after it, despite the fact that they had all the advanced technology and spaceships you could ever need. They had contaminated the air with so much pollution that there were no plants or animals left. In fact, even humans could breathe in an oxygen helmet.

One day, a group of children were walking on the planet, when they passed a cave and noticed a small red flower inside. The flower was very sick – almost dying – so they carefully dug it up with its roots, soil and everything. Then, they started looking for a place where they could look

after it. They searched all over the planet, but it was so polluted that there was no place the flower could possibly live in. Then they looked up at the sky and noticed the moon. It dawned on the children that the plant could survive there as, it was far from pollution created by humans.

So the group of children put on their astronaut suits and climbed into a spaceship. They put the little red flower in the back, and off they went to the moon.

There, far away from all that pollution – and with the children taking turns to visit the flower every day to tend it – the flower started to grow. The flower was so well cared for, that it soon germinated, giving birth to others, and these other flowers also flourished. Before long, the whole moon was completely covered with flowers.

That's why, for a few minutes the moon takes on a soft red sheen, whenever the flowers open up, like a warning light. Maybe it's telling us that if you don't look after your planet, a day will come when flowers will only be able to grow on the moon.

Activity 1 :

Let's do a simple activity to show them how smoke contributes to air pollution.

For this activity you will need a small candle and a temperature resistant glass cover.

- Light the candle.
- Ask the students if they can seek the smoke from the candle.
- Ask the students if they think that this small candle is polluting the air around them.
- Now, cover the candle with the pyrex glass or hold the glass over the flame.

- Soon, soot will settle on the glass and slowly turn it black.

You have now demonstrated to the students that even though the smoke from this small candle cannot be seen, it still does release polluting soot.

Draw their attention to the fact that similar combustion on a very large basis will produce a lot more smoke and cover an even larger area with soot.

How is air quality measured?

Now that the experiment is done, ask the students if it shifted their perception about air quality and pollution (especially in their immediate surroundings).

Ask the students if they can think of other ways in which they "see" air pollutants.

Pose these questions to them:

- Just because they cannot always see the pollutants, does it mean they are not there?
- Do the students think that if the air look cleans, it is pollutant free?
- Ask them if they can use other senses besides "sight" to check for pollutants.

Now guide them through the discussion and draw their attention to the fact that sometimes they may smell pollutants. Ask the students if they have ever smelled pollutants.

Student Activity

Since we're now moving to shifting the focus from seeing the pollutants, to smelling them, do the following activity with the students.

- Tell the students to take a deep breath in. Repeat this a few more times.
- Then ask your students if they can smell things?
- Tell them to list things they can smell (if at all).
- Ask them about other things that they can usually recognize by smelling – maybe their favorite food, the soil after rain, petroleum, flowers, smoke.
- Now place different objects with distinct smells (onion, roses/or other flowers, lemon, oranges, food) in different small boxes and make small hole in these boxes through which the students can smell them.
- Keep the pictures of these objects in a separate bowl.
- Ask the students to match the pictures with the boxes in which those objects are placed based on the smell.

Home Activity for students

Before wrapping up the lessons on air quality and air pollution, tell the students to conduct the following experiment at home. You have already demonstrated to the students that unseen pollutants pollute the air around them. Now, draw their attention to the fact that in general the dirt and dust around makes the air outdoors dirty and causes difficulty in breathing. Explain that they can prove this fact themselves.

Give them the following activity to do:

- The students will need a damp cloth or wet tissue
- They need to go out of their homes with this damp cloth/tissue and wipe any surface.
- It can be a swing in the playground, a door, window glass, a vehicle, or anything.

- Tell them to look at this cloth and tell them to note what they see on the cloth.
- Tell them to repeat the exercise on some other object.
- Tell them to observe what they see on the cloth now?
- Tell them that may notice dirt on the cloth, and that the dirt is a sample of the same dirt that is suspended in the air and which pollutes it. This dirt has adverse effects on our health.

Air Pollutants

What are air pollutants? Air pollutants are tiny solid particles, liquid droplets or gases suspended in the air. These can be natural or the result of human activity.

- If such substances are present in large amounts, they affect human health and the environment.

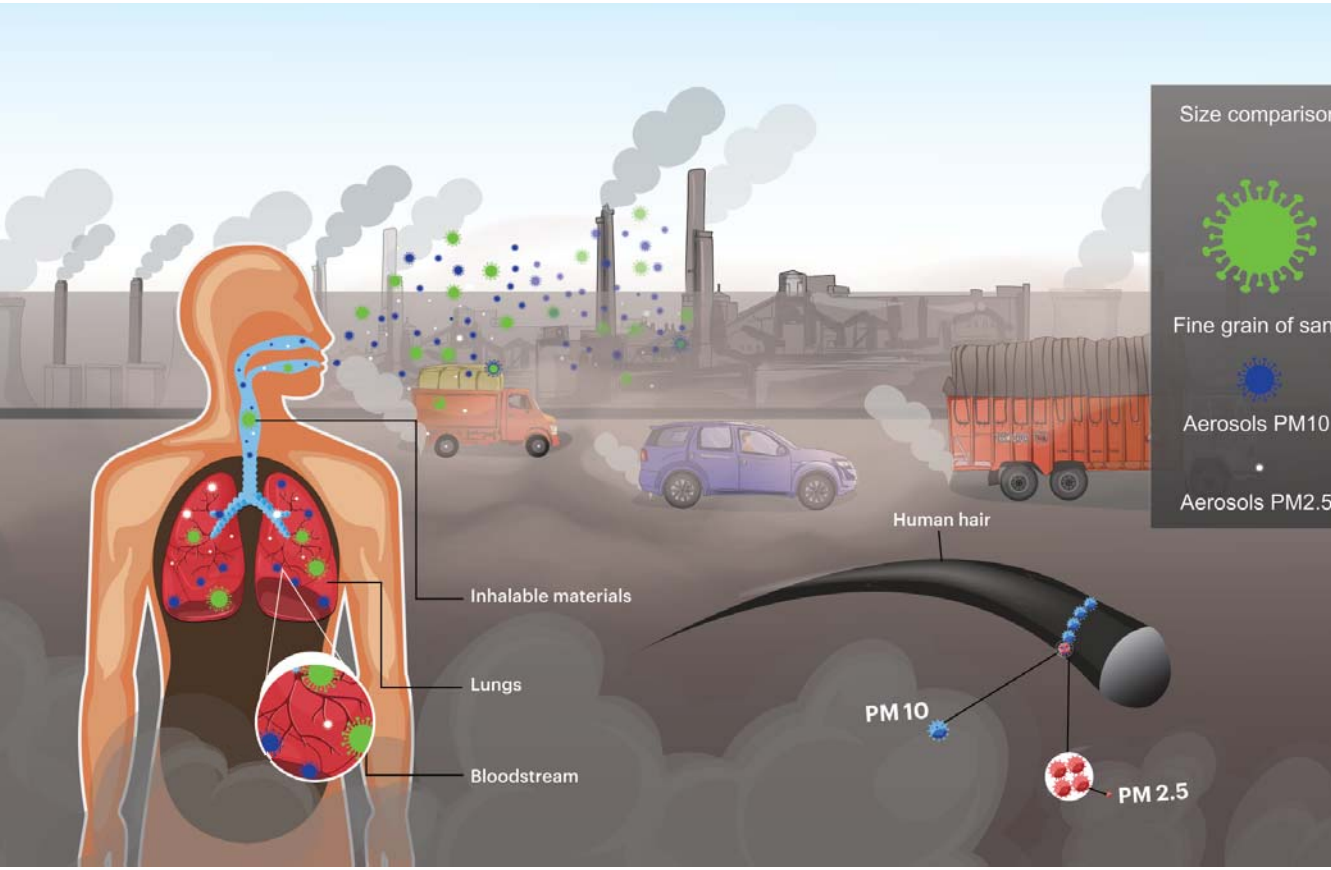
What is Particulate Matter(PM)?

- PM consists of extremely small solid or liquid matter suspended in the earth's atmosphere.
- There are ways to measure PM. The expression "PM10" for example means particulate matter that is 10 micrometers or less in diameter
- PM2.5 means particulate matter that is 2.5 micrometers or less in diameter.
- You can understand how tiny these pollutant particles really are by comparing them with more familiar things. For example, human hair is about 100 micrometres thick, so almost 40 fine particles could be placed within it!
- When inhaled, particles narrower than 10 micrometres may be the most hazardous as they can enter deep into the lungs, and some can also get into your blood stream!

Types of Pollutants

Gaseous pollutants: The natural composition of air is 78% nitrogen, 21% oxygen and 1% a mixture of gases like argon, helium, carbon dioxide, methane, hydrogen etc. and water vapour. Gaseous pollutants are gases like nitrogen dioxide, Sulphur dioxide, carbon monoxide and ozone, which are normally not found concentrated in the air we breathe. However, these gases are increasingly being found in the air because of the burning of fossil fuels, through direct emission or through complex chemical reactions with other elements. They lead to harmful effects on human health, as well as on the environmental, for example acid rain, which causes further damage to water bodies and buildings. Fossil fuels are made up of the remains of material that was organic or living matter many thousands of years ago. Some important examples are natural gas, coal, and petroleum.

Liquid pollutants: Aerosols are the most commonly found liquid air pollutants. These are liquid droplets (or very fine solid particles) that are suspended in the air. Aerosols can be both human-made and naturally



occurring. Natural occurring aerosols can come from fogs, geysers, or liquid emitted by plants and trees. Man-made or anthropogenic aerosols can come from paints, sprays, and other industrial products.

Solid pollutants: Particulate matter and aerosols are the main solid air pollutants. These are very fine solid particles. These particles are very small in diameter measured in micrometres, mentioned earlier. PM2.5 and PM10 indicate that the substances measured are 2.5 and 10 micrometers respectively. Due to their small diameter, our airways are unable to filter them and thus they find their way to our lungs resulting in a severe impact on health. Naturally occurring PM comes from dust, sea spray, forest/ grassland fires, dust storms etc. Anthropogenic PM comes from the burning of fossil fuel.

You may have noted that students often confuse between pollutants and their sources. As you proceed with the class, remember to go back to this point and clarify these doubts for the class.

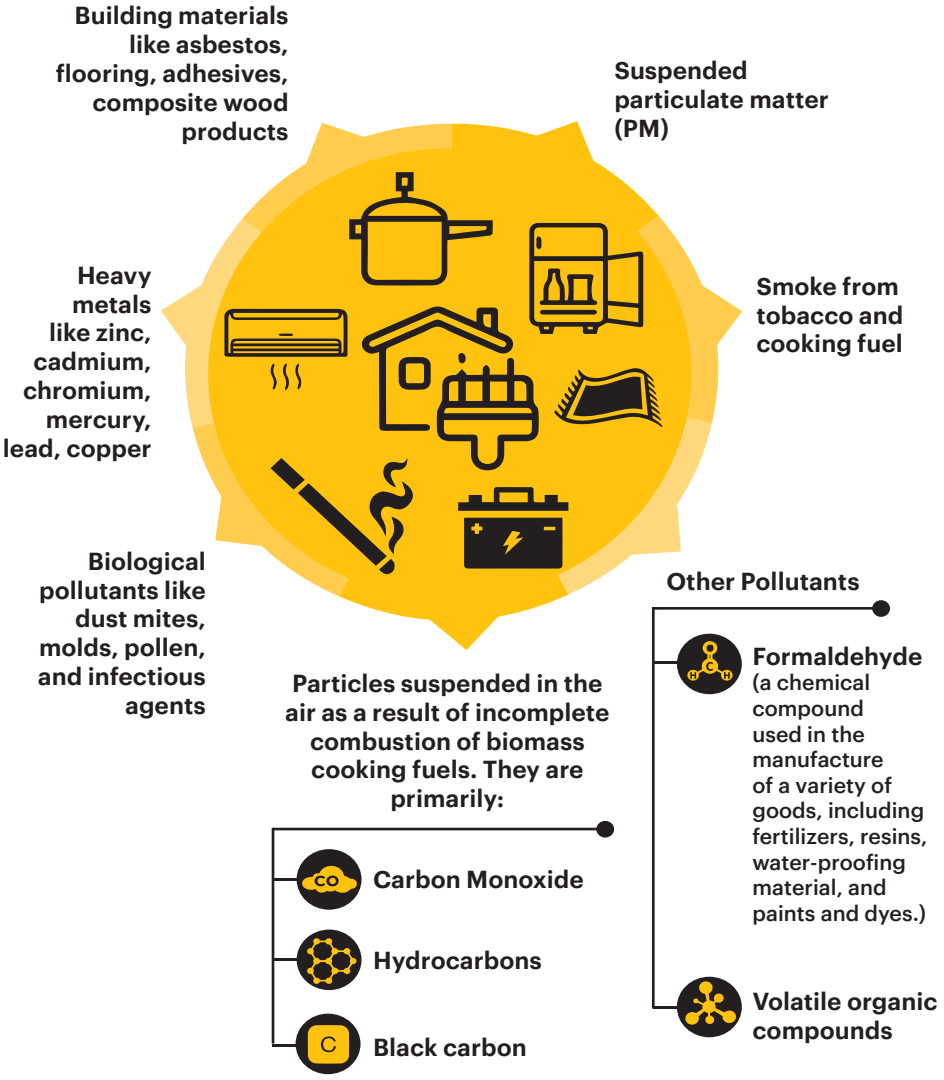
Group Discussion

Here are a few prompts for the students:

- You learnt about air pollutions caused by harmful substances.
- You also learnt that these harmful substances are called pollutants.
- Do you recall that these air pollutants can be gaseous, liquid or solid in form?
- Can you name some of the pollutants in each of these three categories?
- Do you know what the major air pollutants in India are?
- What are the common sources of air pollution in your city or locality?

Indoor and Outdoor Air Pollution

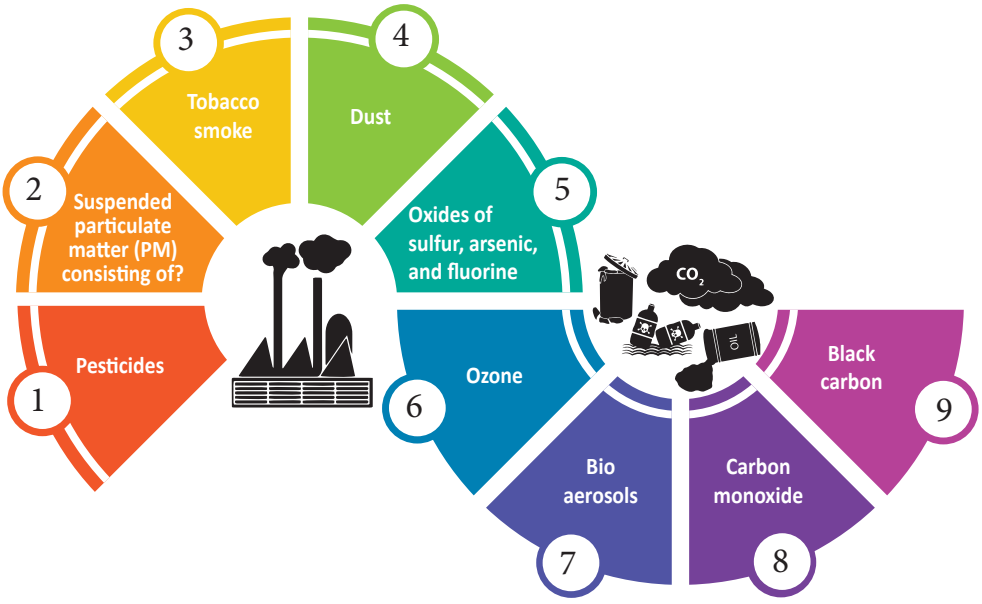
Indoor Air Pollutants



Sources of Indoor Air Pollution

- Combustion of biomass cooking fuels like cow dung and wood
- Tobacco smoking
- Airborne particles produced from microbial, viral, fungal matter
- Microbes from organic materials, humidifiers, vaporizers, heating, ventilating, and air conditioning systems (HVAC)
- Resins, waxes, polishing materials and paints, cosmetics, binders, incense, dhoop and mosquito coils
- Infectious agents produced in stagnant water, mattresses, carpets, and humidifiers too pollute indoor air

Outdoor Air Pollution



Outdoor air Pollution sources

- Construction activities
- Vehicular emissions
- Agricultural practices including crop burning
- Tobacco smoking
- Trash burning
- Power plants emissions
- Fuels used in factories, generators etc. (oil, coal)
- Building materials
- Marine/sea sal

ACTIVITY

Air Pollution Monsters (A play)

Instructions: Ask students to volunteer to play any characters character given below and read out the dialogues from the script. They may later perform it as a street play or for a school assembly to spread awareness about the air pollutants or monsters that are linked to Air Pollution

Cast of Characters

Anjali
Rohit

The Monsters (5): (The Gremlins may be cast singularly or as a group of actors.)

- Sulfur Dioxide
- Nitrogen Oxide

- Lead
- Ozone
- Particulate
- Carbon Monoxide

Setting: Anjali and Rohit are sitting in a living room with the television, radio, fan, and three or four lights on. They are watching a television show.

Scene:

Anjali: This is my favorite show!

Rohit: Yeah, I just love the Power Rangers. The song that's playing on the radio right now is pretty cool, too. It goes along with the action on the TV.

Anjali (She gets up and looks outside the window.)**: Hey, Rohit look at that! (Points to the sky)**

Rohit: Wow! I wonder what it is? Let's go outside and get a better look.

(Rohit and Anjali go outside. A large cloud comes closer to them. Underneath or behind the cloud are the Air Pollution Monsters. The cloud stops right in front of Rohit and Anjali. Immediately, the Monsters start jumping around and making faces at the audience and Anjali and Rohit.)

Rohit: Who are you?

Sulfur Dioxide: We are the Air Pollution Monsters. We've come to take over your town.

Anjali: Why would you want to do that? We are decent people and anyway we have our own leaders.

Particulate: You may be nice and decent people, but nobody seems to care about the air in this town. So, it looks like a good place for us to live in. (sneers)

Rohit: I notice each of you has a different name. Why is that? Aren't you guys all the same?

Carbon Monoxide: We have different names because we come from different sources and cause different problems.

Rohit & Anjali: Oh no!!

Carbon Monoxide: I'm Carbon Monoxide. I mostly come from car exhaust. I like to make people dizzy and give them headaches and then make them die, if I feel like it. (Twists hands menacingly)

Sulfur Dioxide: I'm Sulfur Dioxide. I come from smokestacks of power plants and industries. I can hurt your eyes, noses and lungs. I can even eat away iron and steel. I like to make the air look hazy. (Lunges at audience)

Nitrogen Dioxide: I'm Nitrogen Dioxide. I let out a yellow-brown color and I come from cars, electric power plants and other large industries. I can make the air brown and hazy. I like to hurt lungs, plants and metals. (Makes an evil laugh)

Lead: I'm Ozone. I'm invisible by myself, but when I get together with my friends, I can help form smog. I can make it hard to breathe. (Lunges at audience)

Ozone: I'm Ozone. I'm invisible by myself, but when I get together with my friends, I can help form smog. I can make it hard to breathe. (Lunges at audience)

Particulate: I'm Particulate. I live in the air and like to travel on the wind. I make things dirty and I can carry harmful chemicals into your lungs and make them stick there. You can't stop me. (Makes a very loud and evil laugh)

Anjali: All of you sound so terrible! We don't want you to live here.

Ozone: You make it so easy for us! You waste electricity and ask your parents to drive you everywhere you want to go!

Rohit: You mean that just because we waste electricity and ride around a lot in the car, you guys are here to stay?

Nitrogen Dioxide: Bingo! Thank you for the invitation to live in your town!

Anjali: Well from now on, you're not invited to our town. I'm not wasting electricity anymore and I'm going to walk or ride my bike if I want to go somewhere nearby.

Rohit: (Firmly) Yeah! We're starting right now!
(Rohit and Anjali rush inside and turn off all the lights and appliances they had left on.)

Monsters: OH NO! We can't live in this town if no one is wasting energy! This doesn't seem like a very good place to live in after all.

Lead: I'm sure we can find another town where people are wasting energy. C'mon, let's go! (The Monsters leave in their cloud.)

Anjali: What do you want to do now?

Rohit: Let's go outside and ride our bikes in the fresh, clean air.

Anjali: I hope those monsters don't come back.

Rohit: They won't as long as we continue to use energy wisely.

The End

Human action and air pollution

To check whether students can tell the difference between human-made and natural sources of air pollution, pose the following quiz to them. Ask them to identify which of these pollutants or sources come into being because of human action.

- Smoke and fumes from fossil fuels
- Tobacco smoke
- Organic compounds from plants
- Pesticides
- Dust from the Thar desert

Ask the students to think of some daily activity they are involved in or witness which contributes to air pollution? In this way, you can test if they can recognize local sources of pollution.

Can you see air pollutants?

Now that you have the students thinking about local sources of pollution, conduct the following activity with them in class to identify local pollutants around them-

For this activity, you will need the following:

4-inch squares of white tagboard, clear plastic wrap, petroleum jelly, 12-inch pieces of string, paper hole punch, tape.

- Cover tagboard squares with plastic wrap.
- Punch hole in one corner.
- Loop string through hole and tie.
- Cover one side of the square with a thin layer of petroleum jelly.

- Hang this wind catcher somewhere in the class and observe what gets caught in the jelly after 2 days. Then discuss the results in class.

Ask the students to conduct a similar experiment at their homes and get back the wind catcher along with their written observations. Discuss the local sources of air pollution with them, including indoor sources that they might have missed.

Ask the students to think about incense sticks, air conditioners, cooking fuels, humidifiers, house moulds, lack of ventilation etc..

Optional Group Activity: Let's play a game of bingo!

For this game, you can be the caller.

- Here is the list of 16 words that you will call out to the students.
- All the students will make bingo card of 4 squares by 4 squares and randomly fill the terms you call out (they are also listed in the student manual).
- You will call out the definition of the terms (given next to the terms) and will keep crossing off words as you call out its definition.
- Students will cross off terms as they make correct guesses.
- The first student to cross off four squares in straight line (across, down, or diagonally) is the winner!

You should, however, cross-check the words to see if the student has correctly guessed the terms for the definitions called out.

Word list for Bingo

- Pollutants – substances suspended in the air that have toxic effects on human health and the environment.
- Pesticide– a chemical substance used to kill pests that harm crops, but is also a cause of air pollution.

- Coal – a fossil fuel used for cooking and in manufacturing processes and is also a harmful pollutant of the air.
- Asthma – a respiratory condition in which the lungs and its airways are seriously affected, making it extremely hard for the patient to breathe. It is a painful and life threatening illness. It is the most common non-communicable disease among children around the world.
- AQI – a measurement used to define the level of air pollution at any given time.
- Cars – vehicles used for personal transportation and run on petrol/ diesel which cause air pollution.
- Lungs – a pair of organs located inside the rib cage whose role is help human beings to breathe, let oxygen into and out of the body.
- Particulate matter – tiny particles of dust, soot, and liquid in the air, which are too small to see and are the most common air pollutants.
- Dust – is a common natural air pollutant found in dry areas or on roads.
- Atmosphere – another name for the air around you.
- Air quality – a measure of how clean or dirty the air in an area is.
- Maroon – it is the color that the AQI would show if the air is severely polluted.
- Indoor air pollution – It's the type of pollution that happens in your home or school or in any building.
- Odours – you cannot see these, but you can smell these sources of air pollutants.
- Tobacco – people smoke this substance that is harmful not only for their health, but anyone near them, and also for the air.
- Breathe – To take in air and to expel it; respiration

Air Quality Index

It is now time to introduce some details about the concept of measuring air quality to the students.

- The Air Quality Index indicates the concentration of pollutants in the air in a given area. The index is a very informative tool and is used by the government to alert people about the quality of the air and how bad the air pollution is at a particular time in an area or city. You can use it to plan your day especially during peak pollution periods. It also helps to explain actual health effects of air pollution in a given area.

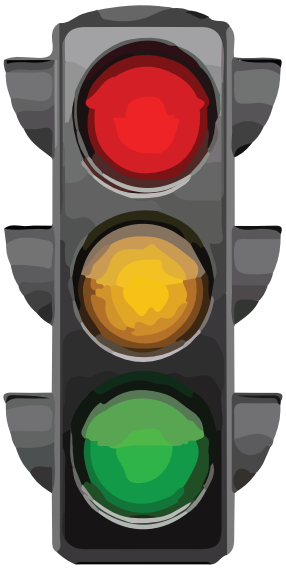
- This tool is especially useful for members of vulnerable populations who are at high risk of harmful health effects of air pollution including the elderly, children under 5 years of age, pregnant women and people with pre-existing illnesses such as asthma and other airway or lung diseases, heart and blood vessel diseases, or any other illnesses aggravated or caused by air pollution.

The AQI tool uses a colour code to help one determine if going outside is a good idea or not:

- Dark Green – good (minimal impact)
- Light Green – satisfactory (minimal breathing discomfort for sensitive people)
- Yellow – moderate (breathing problem for people with lung, asthma and heart diseases)
- Orange – poor (breathing people for most people on prolonged exposure)
- Red – very poor (respiratory illness for all people on prolonged exposure)
- Maroon – severe (affects healthy people and is very harmful for people who already have respiratory diseases)

How do you use the AQI tool?

How do you use the AQI tool?



You can imagine the AQI tool as a personal traffic light. Before stepping out of your house, make sure to check the AQI tool/traffic light by following these steps:-

- **Check the AQI for the day and your area**
- How do you check the AQI daily?
- You can download the apps or visit the websites for the Central Pollution Control Board (CPCB): (https://app.cpcbccr.com/AQI_India/) or System of Air Quality and Weather Forecasting And Research (System of Air Quality and Weather Forecasting and Research (SAFAR), Ministry of Earth Sciences (MoES), Govt. of India, (http://safar.tropmet.res.in/).
- In case of lack of availability of the internet/smartphone services, you can also refer to the radio news or newspapers.
- Before planning any activities or leaving the house, identify the air quality category to see how severely polluted the air is on that day.
- Find out the health advisory you need to follow for the day in order to minimize your exposure and reduce chances of falling ill. If you are vulnerable to health effects of air pollution, recognize the risks and take precautionary measures to protect yourself.
- Plan your day and try to follow the advisory for permissible activities according to the AQI category
- **Red: STOP.** Avoid going out if possible
- **Orange: PAUSE.** Check the health risks
- **Green: GO:** Follow advisory for daily activities

Air Quality Monitor

- To find out what the air quality is and to create the AQI chart, the government and other agencies use a device called an air quality monitor.
- Air quality monitors are sensor-based devices that measure the level of most common air pollutants.
- The government uses monitoring devices to warn the people about the pollution level, while industries use them to keep a check on their emissions level.
- There are also smaller monitors available, for taking measurements of air quality, both indoors and outdoors, that one can install in one's home.

AQI Monitor

- The Government of India's System of Air Quality and Weather Forecasting and Research (SAFAR) is a national initiative to monitor, forecast and publish location-specific air quality. It consists of an LED display that shows the real-time colour coded AQI along with a 72-hour forecast.
- SAFAR also has a mobile app available for certain cities like Delhi, Pune, Mumbai and Ahmedabad.
- Additionally, there is the SAMEER mobile app that gives real-time AQI for more than a 100 cities across India.
- It would be a good practice to download the relevant app on your parents' phone and keep yourself updated with the AQI for the day!

Student activity – optional

Make three sets of 6 paper cut outs for the students.

- The first set of 6 are simply colored pieces of paper (dark green, light green, yellow, orange, red, maroon)
- The second set of 6 are labeled as the 6 categories (good, satisfactory, moderate, poor, very poor, severe)
- The third set of 6 are labeled with the health effects associated with the 6 categories mentioned above.

Now randomly distribute the 18 pieces of paper among the students.

Direct every student to find the corresponding partners for their cards based on the information that they just learnt about AQI readings.

At the end of the activity, you should have 6 teams of 3 members each.

A game of "Yes" or "No"

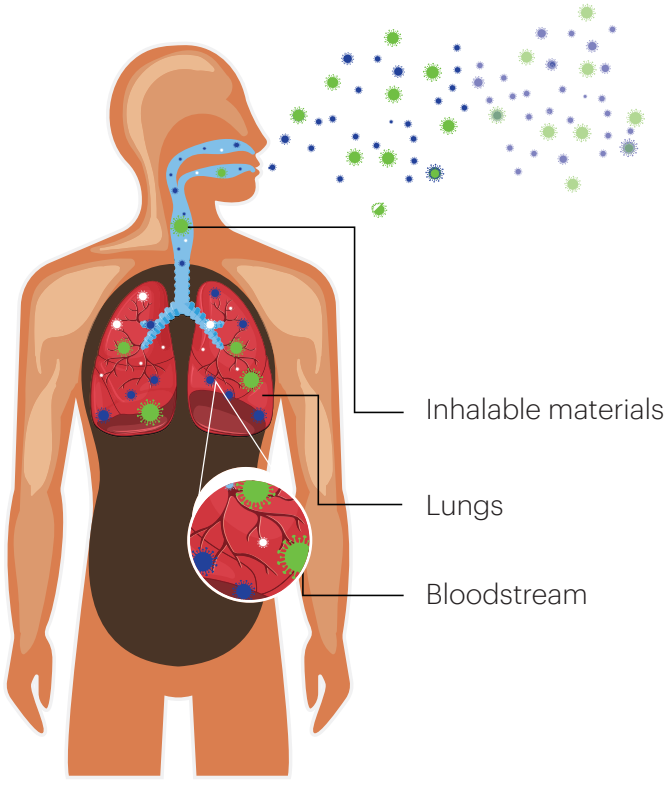
Ask the students to respond to the following questions with a "Yes" or "No", to test their understanding of the last lesson. However, you need not limit yourself to these questions alone.

- Is it okay to go out to play if the AQI card shows dark green?
- The air outside looks very clean, but your AQI card shows red, should your grandma go out for a walk?
- It looks foggy outside and the air smells smoky. Is this a sign of good air quality?
- There was a dust storm in your locality. Should a person with asthma go out shopping?

Air Pollution and the respiratory system

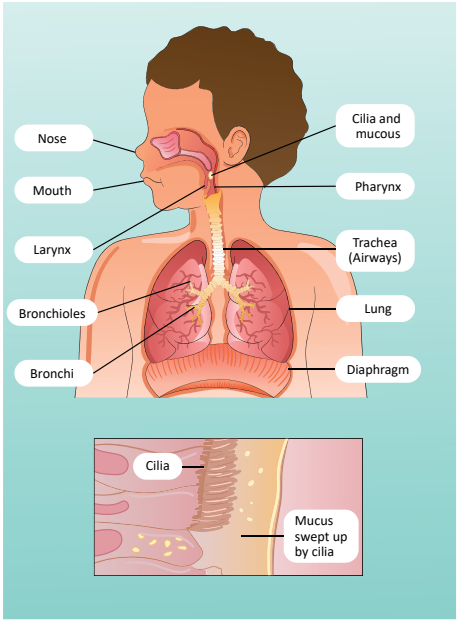
The students will learn about what happens when they breathe in a polluted environment.

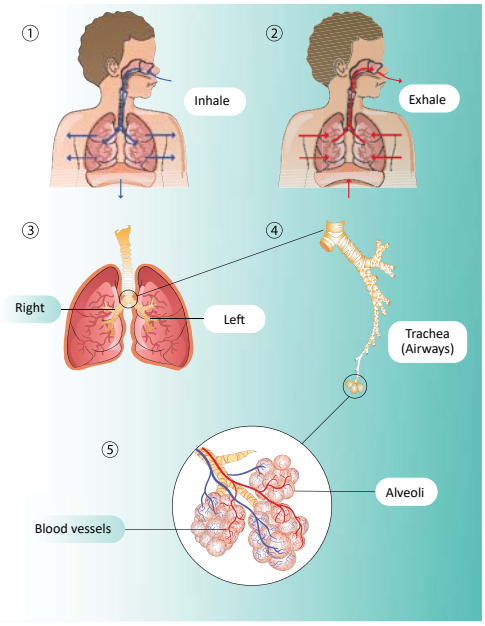
- The basic components of the respiratory system
- How the lungs work. How we breathe.
- Function of the lungs in the circulatory system
- How pollutants enter the respiratory and circulatory system
- What is lung capacity? How is it affected by air pollution?



The respiratory System

- The respiratory system controls our breathing and gaseous exchange in the body. It consists of airways, the lungs, blood vessels and muscles.
- Its main function is to supply oxygen to our body and remove carbon dioxide and any other waste gases that we inhale.
- The air we breathe in moves in the airways (nose, mouth, larynx, pharynx, bronchi and bronchioles), before it finally reaches the lungs where the gaseous exchange takes place.
- Cilia and mucous in the airways trap foreign particles which we then cough or sneeze out.
- This air then passes through the larynx, pharynx and finally to the lungs.





Activity

Since the students now know about respiration, conduct and guide the following activity for them:

- Ask the students to put their hands on their chests and breathe.
- Ask them how they feel. Do they sense their chest rising and falling in a rhythmic pattern?
- Now, ask them to cover their mouths and focus on breathing through their nose alone.
- Ask them to observe how they breathe.
- Next, ask them to pinch their noses shut and inhale through their mouths.
- Ask them to observe how their chests rise and fall during this activity.

Know how your lungs work

- When you breathe in air, you use muscles of your rib cage which tightens and expands.
- As you breathe out, your rib cage muscles relax.
- The air passes through the airways on its way to the lungs. Before it reaches the lungs the windpipe (trachea) divides into two smaller tubes (called the bronchi), each tube (bronchus) enters one lung (left or right)
- These tubes/bronchi then divide further and further into smaller bronchi.
- The smallest airways end in small air sacs (imagine very small balloons) called alveoli.

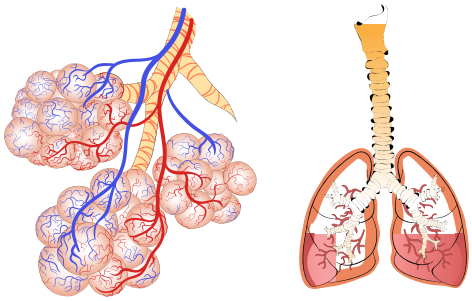
- As you know with a balloon, when air enters, it expands. So do the alveoli.
- Now these alveoli are surrounded by many tiny blood vessels, and these vessels absorb oxygen from the air in the alveoli and carry it to the whole body.
- The left-over waste gases in the alveoli, such as carbon dioxide are then "blown" out when we exhale/breathe out.

Ask any student to trace the route oxygen takes inside your body on the flipchart.

Understand what lung capacity is and how it may get affected by air pollution

By now the students understand the role of the respiratory system, how we breathe and the route of the air passages in the system.

The students are now also more comfortable with the functioning of the lungs.



You can now use this knowledge to introduce the students to the concept of "lung capacity" and from there on make them see how it connects to the hazardous consequences of air pollution on health.

- Air is one of the most basic needs of life and we cannot survive more than a few minutes without it.
- An average adult breathes in ~11,000 litres of air in a day.

- Thus, breathing in toxic substances affects the functioning of the lungs over time.
- Very high pollution levels make breathing difficult even for healthy individuals and can cause coughing, wheezing, irritation, and dangerous stress on the circulatory system.
- Still, the amount of pollutants released in the air far outweighs the amount of pollutants released into the ground and surface water and land combined.

Facts you should know!

An average human being breathes in approximately 20,000 litres of air every day. Imagine the amount of pollutants that could bring into the body, given today's environment!

The air in the national capital Delhi is so polluted that it has been found that 1 in every 3 children in the city suffers from impaired lung functioning.

Lower respiratory tract infections have been found to be the biggest killer of children, compared to all the other health-related illnesses caused by air pollution.

The figures are very grim. According to estimates, India loses one child every three minutes due to air pollution. Because of this, in the last 27 years, more than a crore of children in India did not live to see their sixth birthday.

The situation is very serious all around the world. One in every ten deaths among children globally is attributed to air pollution caused health complications.

Why are children more vulnerable?

Now the students understand how breathing in polluted air directly exposes them to toxic substances. According to the World Health Organization, students are especially vulnerable to air pollution for various " behavioural, environmental and physiological factors ". Here we introduce ways in which physical and biological factors make children more susceptible to polluted air than normal healthy adults.

- Children, unlike adults, do not have fully developed organs. Since children's respiratory organs are still developing, they are more vulnerable to toxic air pollutants.

- Also, since children have narrower airways, it means that the entry of toxic air pollutants can more potently affect the tissues there and cause inflammation.
- Children have weaker immune systems and so they are more vulnerable to any toxic and foreign substances in the environment.
- Children also inhale more air (and more air pollutants) per unit of body weight than adults.

It may be a good idea here to engage in a class discussion to check whether the students have internalized the lesson. Children are often inclined to not take health hazards seriously (especially if it is implied that their outdoor activities might be cut short!).

Let us now introduce the behavioural and environmental factors.

- Children spend a substantial part of the day outside, playing and engaging in physical activity in potentially polluted air.
- Small children spend much time near their mothers who often cook with polluting fuels and devices.
- Children live closer to the ground, where some pollutants reach peak concentration.
- Children also tend to breathe through their mouths. Unlike the nose that is lined with natural filters like (cilia and mucous – do read up more on them!) that trap smaller particles and prevent them from entering the lungs, the mouth has no such filters. Thus, breathing with the mouth makes us more susceptible to toxic pollutants.
- Moreover, children do not recognize symptoms as quickly as adults, so they may not tell their guardians about the health effects they might be feeling till the symptoms become much more serious. This issue leads to a delay in the medical response to their condition and worsens their health.

Class activity

Conduct the following activity with the students. The aim here is to display that physical exercise increases the exposure to pollutants because you tend to breathe faster.

- Have the students sit in their seats and relax.
- Tell them to breathe in and out very slowly till their breathing becomes very calm and slow.
- Ask them to reflect on how they feel? They should feel relaxed.
- Now, ask them to get up from their seats and jump up and down.
- Count to 30 and then ask them to stop.
- Now, ask the students to focus on their breathing.
- Ask them to notice if they are breathing faster or slower now?

Learnings from previous activity

- After this activity, the students should understand that they breathe faster after engaging in any physical activity.
- When muscles work more than usual, they burn extra calories.
- This requires more oxygen for which we tend to breathe faster.
- When we breathe faster and deeper, we take in more oxygen.
- As is now known to the students, the more you breathe in, the more pollutants you take in (especially if one resides in a highly polluted region).
- The more pollutants someone breathes in, the more at risk he/she is from pollution related ill-health effects.

Optional group recitation - Let's sing along!

'Air is Everywhere I Go'
(melody of 'Mary had a Little Lamb')

Air is everywhere I go
Where I go, where I go
Air is everywhere I go
And this is how I know!

I feel it brush against my face,
'gainst my face, 'gainst my face,
I feel it brush against my face
When the wind does blow!

Air is everywhere I go
Where I go, where I go
Air is everywhere I go
And that is how I know!

I hear it blowing through the trees
Through the trees, through the trees
I hear it blowing through the trees
It whistles as it goes!

I see it filling my balloon
My balloon, my balloon
I see it filling my balloon
Which I watch as it grows!

Optional Creative writing exercise- write your own short poem on air pollution

Read this poem that was written by a third-standard student from Madinah Academy of Madison, Wisconsin, USA

My Cool Friend

Air is my friend.
Now and till the end.
Air is all around.
Up in the sky and near the ground.

We know it's there though it can't be seen.
Let's work together to keep it clean.
Air, Air, I know you're here.
I can feel you ever so near.
You are the thing that helps me live.
And anything you want I will give.
You lift me up.
You keep me cool.
And that's why I say you rule.
I know you're hurt.
When people pollute.
And to those who help you
I give salute

Air pollution and its impact on health

These sections are data and information heavy. The aim of these sections is not to get the students to learn these figures. Instead, these lessons should focus on getting the students to understand the gravity and extent to which air pollution affects people (adults as well as children).

Some of the lessons as you proceed from here, including sections on health effects may be more difficult for students to follow or may cause them to worry excessively. Extra precaution should be taken to ensure that you do not get into too much details of these health effects. The children only need to understand in a general way which parts of the body get affected by air pollution.

Definition of Health Effects:

- COPD- Chronic Obstructive Pulmonary Disease (COPD) is an umbrella term used to describe progressive lung diseases including emphysema, chronic bronchitis, and refractory (non-reversible) asthma. This disease is characterized by increasing breathlessness.
- Pneumonia – Pneumonia is an infection that inflames the air sacs in one or both lungs. The air sacs may fill up with fluid or pus (purulent material), causing cough with phlegm or pus, fever, chills, and difficulty in breathing. A variety of organisms, including bacteria, viruses and fungi, can cause pneumonia.
- Stroke – A stroke is a sudden interruption in the blood supply of the brain. Most strokes are caused by an abrupt blockage of arteries leading to the brain (ischemic stroke). Other strokes are caused by bleeding into brain tissues when a blood vessel bursts (haemorrhagic stroke)

- Ischaemic heart disease – Ischemic means that an organ (e.g., the heart) is not getting enough blood and oxygen. Ischemic heart disease, also called coronary heart disease (CHD) or coronary artery disease, is the term given to heart problems caused by narrowed heart (coronary) arteries that supply blood to the heart muscle..

Effects of air pollution on children's health

- Adverse birth outcomes
- Infant morbidity and mortality
- Insufficient neuro development
- Childhood overweight and obesity
- Respiratory problems
- Otitis media (an ear infection)
- Childhood cancers
- Negative health outcomes later on in life

Adverse birth outcomes

- Research has found that air pollution can have adverse health • Research has found that air pollution can have an adverse effect on the fetus if a pregnant woman is exposed to high levels of air pollution
- Babies born to a mother exposed to air pollution have been found to have increased chances of being stunted and underweight.

- Do you understand what stunted growth and under-weight means?
- In simple terms, stunting means that the kids do not grow up to their full potential in terms of height and weight.
- Stunting also affects a child's mental and cognitive growth.
- It should also be noted that stunting is essentially a condition that arises because a woman does not get sufficient nutrition during pregnancy and her newborn does not either, in the earliest stages of its life..

Infant mortality and morbidity

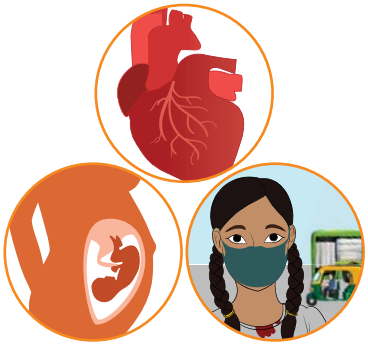
- Infant mortality due to air pollution means that prolonged exposure to severe air pollution and toxic gases causes the death of infants.
- In fact, researchers have found that depending on the kind of air pollution mothers are exposed to, there is an increased chance of NICU (neonatal intensive care unit) admission from 4–147% .
- Morbidity is the condition of being sick.
- Air pollution is also known to increase episodes of child morbidity!
- A six-city study in India shows that an increase in ambient air pollution has led to a significant increases in child morbidity.
- You will learn more about the kind of diseases and health issues that affect children who have been exposed to sustained or high levels of air pollution..

Childhood weight gain and obesity

- Emerging research shows an association between metabolic outcomes in school-going children and exposure to outdoor air pollution.

- Not just current exposure of school going children to air pollution, but past exposure before they were born (through pregnant mothers) and exposure right after birth have been found to affect weight gain and the body mass index.

- In more recent times, emissions related to traffic have led to challenges of excessive weight gain and obesity in school children.
- Moreover, traffic related pollution also leads to insulin resistance in children. (Insulin is the hormone which helps control the amount of sugar in our blood stream. If our body stops responding to insulin, we run a chance of getting diabetes.)



Childhood cancer

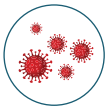
Air pollution has been found to be a cause of the following types of cancer in children:

Leukemia: is known to be caused by exposure to traffic pollution during pregnancy and in childhood.

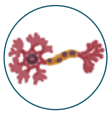
Teratomas: a rare form of cancer, has also been found to be associated with traffic pollution.

Retinoblastoma: a rare form of eye cancer, also found to be associated with traffic pollution

Lymphoma: a cancer of the immune system is one of the cancers most diagnosed in children exposed to air pollution



Central nervous system tumours



Neuroblastoma: cancer in the nerve cells

Nephroblastoma: a type of cancer that affects the kidneys of children

Children sometimes also develop carcinomas, but that happens rarely

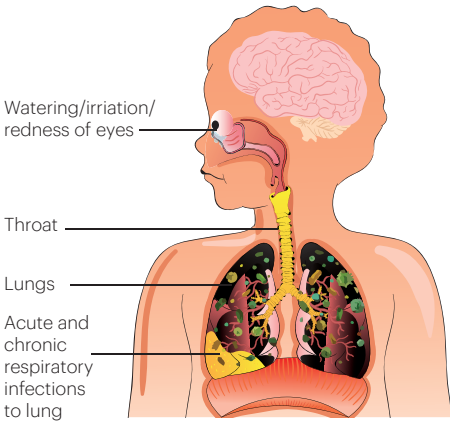
Health outcomes in later life

- Exposure to air pollution severely cuts years from one's total life expectancy.
- Early life exposure to air pollution can affect lung function and development, which in later life increases the risk of chronic lung diseases in adulthood.
- New research also shows that exposure to air pollution during pregnancy affects the later life of newborns by increasing their susceptibility to cardiovascular disease.

Respiratory effects

- Air pollution adversely affects lung function.
- It is now known that exposure to air pollution before birth can affect the development of the lungs and causes problems for young children.

- There is also enough evidence to prove that exposure to air pollution leads to acute and chronic respiratory infection in children.



- In fact, the most common air pollutants, particulate matter and nitrogen dioxide are now associated with pneumonia and other respiratory infections in young children. Lastly, outdoor air pollutants worsen the health levels of children who either already have asthma or have some early symptoms .
- Similarly, even indoor air pollutants resulting from the use of polluting cooking fuels lead to the development or worsening of asthma in children.
- A study conducted in Delhi has indicated that respiratory symptoms such as compromised lung function and hypertension among children between 4–17 years of age is far worse there than in children residing in less polluted areas of the country.

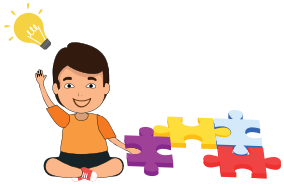
Eyes

- In the short-term, eyes can show symptoms including watering/ irritation/redness etc.

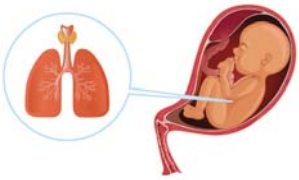
Neurodevelopment

- Children living in socio-economically deprived areas with higher levels of air pollution, especially with a high level of diesel PM and nitrogen dioxide have increased chances of suffering from intellectual disability.

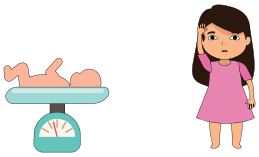
- In fact, one study showed that even a short-term exposure to air pollution could worsen psychiatric disorders among children just a few days later.



- A longer exposure on the other hand affects children's mental development and may result in psychotic disorders, attention deficit disorders, autism and slowed cognitive development.

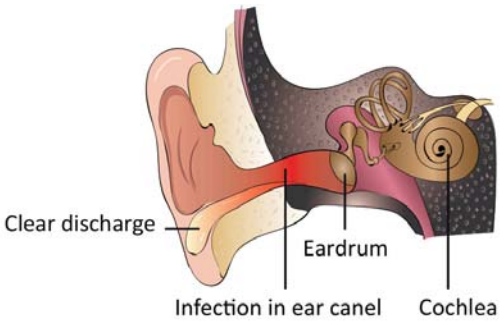


- Air pollution also hurts cognitive development by causing stunting and leads to inadequate weight gain..



Otitis media

- Otitis media is a disease of the ears where the air filled between the ear drums gets infected and inflamed.
- Research has found that outdoor air pollution can lead to the occurrence of otitis media in children
- In fact, even indoor air pollution from using polluting fuels increases the risk of otitis media in children.
- Other factors that increase the risk are exposure to second-hand tobacco smoke.



- Otitis media leads to ear pain and fever, but in the long run, recurrent otitis media can lead to much more serious health effects like hearing loss and difficulties in learning and communication.

Stunting

- Stunting is the impaired growth and development that children experience as a result of poor nutrition, repeated infection, and inadequate psychosocial stimulation. Children are defined as stunted if their height-for-age is more than two standard deviations below the WHO Child Growth Standards median.

Some other Intersting Facts

Outdoor air pollution and health impact

Like any developing country, India too is facing the negative consequences of rapid industrialization and the growth of the power, transport and manufacturing sectors, as well as of urbanization. These factors have led to an exponential increase in air pollution.

- More than 70% of India's population is exposed to an air pollution level that is four times the safe level recommended by WHO
- Not a single Indian state or Union Territory is in compliance with the safety limits recommended by WHO.
- The result is that Indians lose 5.3 years of their average life expectancy because of air pollution.
- WHO report "Air Pollution and Child Health" indicated that 101,788 children under 5 years of age in India died due to air pollution in 2016.
- More than half of these recorded deaths were of girl children.

- Outdoor air pollution has been named the 7th biggest cause of health problems in India.

Indoor air pollution and health impact

- The World Health Organization has observed that any pollutant released indoors is 1000 times more likely to reach inside a person's lungs as compared to when it is released outdoors. It is referred to as the "1000 times" rule.
- This is simply because closed indoor spaces aid the concentration of the pollutants more than the outdoor spaces!
- Indoor air pollution is an established risk factor for pneumonia, stroke, ischaemic heart disease, chronic obstructive pulmonary disease (COPD) and lung cancer in women and children.
- WHO has reported that indoor air pollution costs India as many as 1.3 million lives every year.

Can you recall: Quiz

You can use this quiz to test the children's learnings so far:

- This part of a child's respiratory system is narrower than adults and is more vulnerable to inflammation?
- Name any one neurodevelopment challenge that is known to occur in children due to air pollution.
- What is the name of the inflammation of the middle ear that leads to ear pain and fever.
- An exposure to second-hand smoke from this source is a known risk factor to otitis media.
- The resistance to this hormone can lead to diabetes.

- This source of pollution has been found to lead to obesity in children.
- This is a kind of infection that affects the respiratory system and is caused due to air pollution.
- This is a lifelong breathing condition that can develop or be made worse in children due to air pollution.

Activity-crossword puzzle

Across

1 : Biological system concerned with exchange of blood, nutrients and oxygen

4 : Agricultural run-off that pollutes the air, land and water

5 : Health condition caused by extreme weight gain

7 : Neuroblastoma is a cancer in ___ cells

8 : Natural filters in the nose that catch foreign particles

9 : Low level or non-functioning of insulin causes this health condition

10 : Burning things (like candles) produces this black pollutant

Down

2 : Cancer in the immune system

3 : Infection in ear caused by air pollution

6 : Important organ in the respiratory system that is protected by the rib cage

[1]C	I	R	C	U	[2]L	A	T	[3]O	R	Y			
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Letter from researcher

Read this out loud for the students as a letter from the "Researcher".

Dear children,

I believe your teacher has explained to you about all the ill-health effects associated with air pollution that my colleagues and I have discovered. These learnings may make you feel sad and hopeless, but that is not the aim of our research. Through knowledge sharing, our aim is to make you more informed and aware about your environment.

Knowledge is power children! Now that you know and understand air pollution better, you will be more conscious of your actions and in a much better position to protect yourselves and your loved ones. In fact, why don't you go out and share this knowledge with other people around you, your friends and family? I am sure they will feel loved and cared for if you make them aware of this (mostly) invisible villain and enlighten them on ways to counteract the negative effects of air pollution.

But you may be wondering that I have not yet told you about these "ways of protection" that I previously mentioned. Well, don't you worry about it. As you start the next section, your instructor will tell you all about individual actions you all can take to protect yourselves from this most dangerous villain that we all know air pollution is!

Yours sincerely,

Call to Action (Protection from air Pollution and reducing air pollution in one's own environment)

Now that the students have been introduced to air pollution, pollutants and their sources, air quality index and the different ways in which air pollution affects their health, it is now time to teach them about ways in which they can protect themselves from air pollution. Some of the solutions that students/children can advocate for are described in the flip-chart.

Actions to reduce your exposure:

- Firstly, now that you can read and understand AQI, always check the status before stepping out.
  - Check Website/App for Central Pollution Control Board (CPCB): (https://app.cpcbccr.com/AQI_India/) or System of Air Quality and Weather Forecasting And Research (System of Air Quality and Weather Forecasting and Research (SAFAR), Ministry of Earth Sciences (MoES), Govt. of India: (http://safar.tropmet.res.in/)

- Do not go out to play if the air quality lies anywhere on the scale from poor to severe
- Use masks whenever the air quality is poor. N95 and N99 masks should be used because they are the most effective in filtering out smaller particulate matter like PM2.5 and PM10.

  - It is very important to test the size of the mask as per the dimensions of one's face. An ill-fitting mask is not only ineffective, but could potentially be harmful too.

- Plant trees and saplings in your school premises and at home
- Regularly practice breathing exercises. But please remember: deep breathing exercises during very poor or severe AQI may cause more harm than benefit by exposing you to even more harmful pollutants!
- Eat healthy and nutritious food to build a strong immune system

Actions to help reduce air pollution:

- Use carpools and public transport to minimize emissions (which are a major source of outdoor air pollution)
- Encourage your friends and family to use public transport
- Do not waste electricity or water! Electricity generation and water purification contributes to burning of fossil fuels.

- Refuse, Reduce, Reuse, Repurpose, and then Recycle! [For example, refuse to use single-use plastics, reduce consumption, repurpose plastic objects so that they do no tend end up in waste mountains! Find out about businesses that recycle materials like plastic, fabrics, and tyres.)
- Do not burn crackers, household waste, plastic, wood, leaves etc.
- Find ways of saving rainwater, keeping it clean, and using it for household tasks.
- Make compost fertilizer out of organic kitchen waste.

What can schools do?

Schools too could take steps to reduce their contribution to air pollution. Such projects are especially important because children spend a large part of the day at school and the kind of pollution in and around school greatly affects the level of exposure of the students.

- Children should be encouraged to use school buses as mediums of transport instead of private cars.
- For this purpose, schools should offer bus services on all major routes, and if required, more than one bus on the same route so that all students are comfortably seated.
- The school buses should be encouraged to use cleaner fuels like CNG.

- The school generators too should not be fossil fuel based. Either cleaner fuel like biodiesel or renewable sources like solar energy should be used.
- The schools should have an effective waste management system, including composting, and should ensure a total ban on trash burning.
- More trees should be planted in and around school campuses. In fact, it would be a good practice to have indoor plants in each classroom. Plants will not only serve to clean the air, but taking care of them could also be made into a group activity for instilling a sense of discipline, responsibility and teamwork in the students.
- Rainwater harvesting systems could also be installed in the school compounds.

Children, as we reach the end of this manual on air pollution, you have learnt a lot about how air pollution is not only an immediate health hazard, it also affects you, the young ones, disproportionately. By equipping yourselves with the correct knowledge and information, you can ensure your own safety and also of the people around you. You can also be future advocates for clean air and healthy environment! Many of you may have heard of the three students who got crackers banned in Delhi NCR through their advocate fathers. All of you can stand for your right to a healthy life and so we urge you to be aware young citizens of India and to take steps proactively to reduce air pollution, reduce exposure to toxic pollutants and spread knowledge among people around you. It is never too early to be a change agent and wherever possible, you should step up and take charge – the future is yours.

Conclusion: India has the most polluted cities! The time to act to curb air pollution is now!

Pre and Post Survey

This survey should be taken before reading the manual and flipchart as well as afterwards. This will help you to judge how well the children have understood the contents about air pollution discussed here. There are various statements mentioned below. Mark Y/N against each statement.

1) PM2.5 particles are too small to be caught in our airway's natural filters, while PM10 are big enough to get filtered out of our systems. Y/N
2) Using biomass fuels is good for the environment because unlike fossil fuels they do not produce pollution. Y/N
3) How clean the air looks is a dependable way of measuring air pollution. Y/N
4) The air inside the buildings are always cleaner than outside. Y/N
5) Burning trash is an environmentally safe way to dispose of garbage. Y/N
6) Breathing polluted air is only harmful for people suffering from respiratory diseases. Y/N
7) If air pollution is being caused by a bad odour, the safest option is to breathe through the mouth. Y/N
8) Air pollution adversely affects only our lungs. Y/N
9) Air pollution affects children the least because they have a strong immunity. Y/N
10) Long-term exposure to air pollution can slow cognitive development. Y/N

11) Air pollutants can only exist in gaseous form. Y/N

12) Air pollution can be a cause of both stunting and obesity. Y/N

13) Even if the air looks clear, it is a good practice to check the AQI before stepping out. Y/N

14) Air pollutants always come from man-made sources. Y/N

15) Air pollution only has short term effects on health. Y/N

16) Children breathe in less air per unit of body weight as compared to adults because they weigh less. Y/N

17) Unborn children are not affected by air pollution even if their pregnant mothers are exposed to it. Y/N

18) Air pollution may cause diabetes in children by affecting how the hormone insulin works in their bodies. Y/N

19) Air pollution may cause attention deficit syndrome in children. Y/N

20) Recurrent cases of otitis media will have no effect on children once they grow up, because otitis media only occurs in children. Y/N

ANSWER KEY: -

1)	Y	11)	N
2)	N	12)	Y
3)	N	13)	Y
4)	N	14)	N
5)	N	15)	N
6)	N	16)	N
7)	N	17)	N
8)	N	18)	Y
9)	N	19)	Y
10)	Y	20)	N

Myth Busters:

Myth	Fact
If the air looks clean and there is no visible smog, the air is safe and does not affect my health.	Visibility or how clear the air looks may not always reflect the quality of air. Even on days when you do not see any smog, the air quality can be poor. It is best to check the Air Quality Index for the day. Use the official Website/App for Central Pollution Control Board (CPCB): (https://app.cpcbccr.com/AQI_India/) or System of Air Quality and Weather Forecasting And Research (System of Air Quality and Weather Forecasting and Research (SAFAR), Ministry of Earth Sciences (MoES), Govt. of India: (http://safar.tropmet.res.in/)
Planting certain varieties of plants (like Devil's Ivy or pothos *(Epipremnum aureum)*, Peace Lily *(Spathiphyllum)*, Philodendron, Chrysanthemums *(Chrysanthemum morifolium)*, Rubber plants *(Ficus elastic)*) will purify the air in and around your house.	It is important to plant trees but they cannot be the only solution for cleaning the air inside the house. Reducing air pollution sources is the best way to curb air pollution. It is important, however, to plant trees, saplings in the outdoors for a cleaner and greener environment!

Myth	Fact
Air pollution is a winter problem!	We can see and breathe unclean air in the winter months, especially during the early morning and late evening hours. We must remember that air quality may also be poor during summer months when visibility is better. The emissions from industries and agricultural burning practices also contribute to air pollution. Hence, the effect of air pollution can vary depending on where you live. For e.g. in northern India, winter weather conditions together with agricultural burning pollute the air in the winters. But in the southern states, where the weather and agriculture season might be different, the pollution can come from industrial activities and vehicular emissions from the coastal regions.
Burning incense, candles etc. does not contribute to air pollution	These activities along with burning wood for cooking/heating activities are all sources of indoor air pollution
It is best to exercise and ventilate homes during early morning or late evening.	It is best to ventilate (open windows for air circulation) between 12 pm to 4 pm in the afternoon as the air quality is relatively better at that time. Also, avoid physical exercise, playing etc. during the early morning or late evening hours.
If I feel giddiness, cough, sneezing, headaches etc., the reason could be the changing season and not unclean air.	You may experience these symptoms due to changing seasons and other reasons. But, poor air quality can also be the reason! Immediately refer to a medical practitioner if you experience these symptoms over a significant period as they may develop into some of the long term diseases discussed earlier.

Myth	Fact
Wearing masks can lead to inhaling less oxygen	Although wearing masks can be uncomfortable, it does not prevent adequate amounts of oxygen from coming through. Wear N95 or N99 masks correctly to cover the nose and mouth especially during the winter months and early morning working hours. If you choose to use a face mask, the disposable N95 or N99 is useful provided user instructions are followed. The nose clip of the mask must be adjusted to fit the face. Ensure that the size is appropriate for your face and air only passes through the filter attached at the front. Paper and cloth masks are not as effective.

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This Training Manual for Community level Training on Air Pollution and its effects on Children Health will help to develop Trainers at various levels in the States/UTs under NPCCHH to enable them increasing the awareness level on the increased health vulnerability of children on exposure to air pollution, sources of air pollution to them , children's health effects due to air pollution and better adaptation measures to protect and prevent their health effects due to air pollution in the States/UTs in the country.

PUBLIC HEALTH FOUNDATION OF INDIA
National Centre for Disease Control
Government of India
Ministry of Health & Family Welfare
Government of India
National Health Mission
World Health Organization
India