American Lung Association.

IAQ Matching Game

Students will connect each air pollutant to its source to learn about indoor air quality and where it comes from.

Discussion

We spend 90% of our time indoors and our indoor air can be 3-5 times more polluted than the outdoor air. Various pollutants in the air we breathe can lead to poor health.

Activity

1. Distribute worksheet to students.
2. Give students 3-5 minutes to match the pollutant to its source.
3. Provide answers and discuss.

Matching Game Answers

Environmental Tobacco Smoke	→	Cigarettes and exhaled smoke
Pesticides	→	Sprays and powder use on the lawn or around the house
Lead	→	Paint, dust, and pipes
Biological Contaminants	→	Pet dander, mold, mildew, viruses
Formaldehyde	→	Pressed wood building materials
Volatile Organic Compounds	→	Cleaning products, carpets, copy machines
Asbestos	→	Fibers from insulation and flooring
Radon	→	Uranium in soil
Carbon Monoxide	→	Stoves, furnaces, and fireplaces

Discussion Questions

- Which of these were surprising to you?
- Are there specific types of buildings that would be at higher risk for some of these pollutants? Why do you think that may be?
- What else do you know about these pollutants?
- How can we reduce the number of pollutants in the class/home?

Discussion Points

- Consider discussing a few of the pollutants or health effects in more detail, depending on answers from the discussion questions. In alphabetical order, here are more details on each of the answer choices:
  - **Asbestos:** a type of mineral that is resistant to heat and corrosion. Asbestos has been used in many building materials, including insulations for pipes, ceiling and floor tiles, roofing and siding shingles, etc. Extensive exposure to asbestos (primarily from work-related exposures) can cause lung cancer, mesothelioma, and asbestosis (serious non-cancer disease of the lungs).

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- **Biological Contaminants:** broad category of pollutants that are or were living organisms. This includes bacteria, viruses, animal dander, house dust, dust mites, cockroaches, and pollen. Exposure can trigger allergic reactions and some can even lead to asthma.
- **Carbon Monoxide (CO):** a colorless, tasteless, and nearly odorless gas or liquid that is a combustion byproduct—i.e., gases and pollutants produced from burning fuels. Sources of CO indoors can include: unvented kerosene or gas space heaters or stoves, leaking chimneys, gas water heaters, gas stoves, wood stoves and fireplaces, automobile exhaust, and tobacco smoke. Breathing in CO can cause fatigue, but at high concentrations can lead to impaired vision and coordination, dizziness, confusion, nausea and even death.
- **Environmental Tobacco Smoke (ETS):** aka, "secondhand smoke," is a mixture of smoke given off by burning tobacco products and the smoke being exhaled by smokers. ETS is classified by the EPA as a Group A carcinogen and contains more than 7,000 substances. There is no risk-free level of exposure. Exposure can lead to cardiovascular disease, lung cancer, Sudden Infant Death Syndrome (SIDS), asthma attacks and other serious health problems.
- **Formaldehyde:** colorless, flammable gas with a distinct odor. It is a volatile organic compound (VOC; it vaporizes gases at room temperature) that causes cancer and other harmful health effects. Formaldehyde is used in the production of many products, including wood, paper, plywood, glues and adhesives, some paints and coatings and certain insulation materials. It can also be found in consumer products like cosmetics, dish soaps, medicines, leather treatment and fabric softeners.
- **Lead:** a toxic metal that is naturally occurring and was once regularly used in the manufacturing of common household products and gasoline. In the past, lead was added to gasoline, paints, water pipes, ceramic glazes, fertilizers and used in many industrial processes. Since the late 1970's, elimination of lead in gasoline and paints has reduced lead pollution, but lead can be found in the paint of older homes (build pre-1978) and in the surrounding soil.
- **Pesticides:** chemicals used to kill or control pests (insects, rodents, cockroaches, etc.), or bacteria, fungi, and other organisms. Pesticides are inherently toxic. Pesticides can enter the home or building through dust, tracking in of dirt that contains pesticide used outdoors, and stored pesticide containers inside. Exposure to pesticides can result in eye, nose, throat irritation, headaches, dizziness, nausea, and muscular weakness. Chronic exposure can damage the endocrine and central nervous system, liver, kidneys, and increase your risk of cancer.
- **Radon:** a colorless, tasteless, odorless gas that is naturally occurring and can come into buildings through cracks in walls, basement floors, foundations or other openings. Radon causes lung cancer. It's important to test homes and buildings for radon to know your risk.
- **Volatile Organic Compounds (VOCs):** are gases that are emitted into the air from products or processes. There are a wide variety of sources, including: paint, varnishes, caulks, adhesives, flooring, carpet, cleaners, furniture, air fresheners, cosmetics, tobacco smoke, dry cleaning chemicals, office printers, etc. Breathing in VOCs can irritate the eyes, nose throat, and causes breathing difficulties and nausea. They can damage the central nervous system and other organs and can cause cancer.

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- There are many steps we can take to reduce or eliminate our exposure to indoor air pollutants. The three main categories are:
  - **Eliminate the source:** remove the source that's causing the pollution – e.g., dusting and vacuuming to reduce the dust, eliminating the use of air fresheners, emptying trash cans regularly, etc.
  - **Improve ventilation:** opening up doors and windows to draw in fresh, outdoor air to help dilute the polluted indoor air.
  - **Clean the air:** using a portable air cleaner or upgrading the filter in the building/home's HVAC system.
- There are many other ways we can reduce the indoor air pollutants, including cleaning the room/house with "safer" cleaning products on a regular basis, addressing any water leaks immediately (to prevent mold growth), servicing fireplaces, woodstoves annually and only burning seasoned wood, testing our homes for radon, keeping pets off furniture and beds, and keeping the building/home's humidity between 30 and 50% (to reduce chance of dust mites and mold) just to name a few.

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Indoor Air Quality Matching Game

Name: _____

Activity

Draw a line from the indoor air pollutant to its source.

Environmental Tobacco Smoke	Uranium in soil
Pesticides	Paint, dust, and pipes
Lead	Cleaning products, carpets, copy machines
Biological Contaminants	Cigarettes and exhaled smoke
Formaldehyde	Stoves, furnaces, and fireplaces
Volatile Organic Compounds	Fibers in insulation and flooring
Asbestos	Pet dander, mold, mildew viruses
Radon	Pressed wood building materials
Carbon Monoxide	Sprays or powders used on lawn or around the house