PHYSICAL ENVIRONMENT : TOWARDS HEALTH CONSEQUENCES

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PHYSICAL ENVIRONMENT

• The physical environment comprises all the different factors of nature, including trees, lakes, the ocean.
  ➡ includes both outdoor and indoor surroundings.

• The quality of air for breathe, the water for drink, exposure to noise, harmful orgasms, radiation from the sun and other sources.

• Physical conditions that surround a person can influence person's health.
SOUND POLLUTION (NOISE)

• Unwanted sound heard by an individual.
• Scientifically, noise can be defined as any sound that is over 80 dB(A).
• Sound transmitted in waves and could travel through gas, liquid and solid.
• Sound contains energy.
• Sound possesses frequency and intensity.
INSTRUMENT TO MEASURE SOUND

- **Sound level meter** – It measures the sound pressure, so we get to know the intensity level of the sound in a place.

- **Octave stripe analysis** - An electronic filter to measure intensity and most frequent frequency of the noise.

- **Dosimeter** – To measure the total dose of noise being received by an individual in specific time period. It also can record level of sound pressure and time of the sound exposed to us.
FREQUENCY AND INTENSITY

• Frequency refers to number of complete wave cycles per second.
• The unit to represent frequency is Hertz (Hz).
• Intensity of the sound is referred to the energy that produces the sound by using 20 micropascal as base reference.
• Intensity is stated in decibel (dB).
FREQUENCY

Diagram 6.1a: Low Frequency

Diagram 6.1b: High Frequency
PHYSIOLOGY OF EARS

• OUTSIDE EAR
• MIDDLE EAR
• INNER EAR
Inside your ear

Sound is transmitted by your eardrum and three tiny bones to fluid in the inner ear. This movement is picked up by tiny hair cells and a signal is passed to the brain. It is these cells that are damaged by excessive noise causing deafness.
GROUPS OF NOISE

- **Standard and continuous noise:**
  The intensity of the noise is constant. Changes in the intensity between Sound waves are less than 3 dB(A). For example, sound emitted from the weaver machine.

- **Noise fluctuation**
  Noise is a sound that fluctuates more than 3 dB(A) between peaks of a High sound wave with a low sound wave.

- **Impact sound or impulse**
  This noise has high intensity and short sound period. For example, gunshot sounds, hammering of steel and others.

- **Alternate noise**
  This noise would occur in specific times, such as sawing the woods with a sawing machine. Noise will be produced by the machine while sawing the woods, yet it will stop when the sawing process is not activated.
GROUPS OF NOISE

Diagram 6.2a: Standard noise/continuous

Diagram 6.2b: Noise fluctuation

Diagram 6.2c: Alternate Noise
EFFECTS OF NOISE ON HUMAN

♣ Physiology changes
♣ Psychology disruption
♣ System auditory effect
  ▶ Acoustic trauma
  ▶ Permanent hearing lost
  ▶ Temporary hearing lost
EFFECTS OF NOISE ON HUMAN

• Physiological Changes
Noise causes the increase of blood pressure, rate of inhaling, heartbeat, level of glucose, muscle contraction and also sweating.

• Psychological Disturbances
Psychological disturbances occur due to the exposure of immeasurable noise.
Various factors like adaptation to noise, behaviours and individual emotions.
Noise would be over 55 dB(A), which would interrupt communications and concentrations.
EFFECTS OF AUDITORY SYSTEM

▼ Acoustic trauma
This condition is caused by high intensity sound like explosion and gunshot. This would result the tearing of eardrums, ossicles will be drawn out and organ of Corte will spoil.

▼ Temporary hearing loss
This condition is caused by physiological changes. Hearing ability would recover if the exposure to the noise is no longer than 14 hours.

▼ Permanent slight hearing loss
This would occur if being exposed to noise for a long duration. It can occur on workers who work in a place that send out a lot of noise.
AIR POLLUTION

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Air Composition

- Air is comprised of:
  - ♣ 78% nitrogen
  - ♣ 21% oxygen
  - ♣ 1% other gases
    (argon 0.93%, CO2 0.032%, neon, helium, ozone, xenon, hydrogen, methane, krypton and water vapour).

- If there are presences of other components other than the stated ones, it is considered as air pollution.
<table>
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<tr>
<th>Types of Pollutants</th>
<th>Information</th>
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<tbody>
<tr>
<td>Dust</td>
<td>Solid particles produced through mechanical processes like explosion, milling or breaking down materials such as stones, coals or woods.</td>
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<tr>
<td>Fume</td>
<td>Solid particles that are formed from condensation of gases normally from liquid volatile metals, and usually through chemical reaction processes.</td>
</tr>
<tr>
<td>Smoke</td>
<td>Carbon particles and hydrocarbon that usually with center lining not more than 0.1 μm that are produced via incomplete combustion processes.</td>
</tr>
<tr>
<td>Mist</td>
<td>Liquid particles that are formed from condensation of gases or formed from breaking down of liquid. It can be changed into solid or liquid by increasing pressure and decrease of temperature.</td>
</tr>
<tr>
<td>Gas</td>
<td>Are dust, fume, smoke or mist have center lined that is less than 50 μm.</td>
</tr>
<tr>
<td>Aerosol</td>
<td>Similar as aerosol with center lined less than 1 mm that would disrupts the ray of light and vision.</td>
</tr>
<tr>
<td>Haze</td>
<td>A type of gas that normally exists in solid or liquid form can be changed into solid or liquid form through the increase of pressure and decrease in temperature.</td>
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AIR POLLUTION CLASSIFICATIONS AND CONTAMINATIONS

• **Natural**
  Examples like volcano eruptions, movements of the sea, and natural forest fire.

• **Human Cause**
  Examples in the house activities, industrial processes, agricultural activities, smokes from vehicles, production and utilization of energy, open burning and release evaporating organic materials.
POLLUTANT GROUPS

• Primary Pollutant
  The pollutants are produced directly from the causes.

• Secondary Pollutant
  Pollutants produced from chemical reactions between primary pollutants.
MAIN AIR POLLUTANTS

- Carbon Dioxide
- Carbon Monoxide
- Nitrogen Oxide
- Sulphur Dioxide
- Volatile Organic Compounds
- Suspended Particles
- Photochemical Oxidation
# Health Problems According to Air Pollution

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<th>Types of Air Pollution</th>
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<td>Carbon Monoxide</td>
<td>• Disrupts the ability of the blood to send oxygen to the brain</td>
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<tr>
<td>Ozone</td>
<td>• Causes change in the respiratory tube, decrease the lungs’ ability to work and pain while coughing.</td>
</tr>
<tr>
<td>Sulphur Dioxide</td>
<td>• Causes the contraction of air channels, and individual with asthma would breathe in with more effort.</td>
</tr>
<tr>
<td>Suspended Particles</td>
<td>• Process of blocking large particles in the nose and parts of the upper lungs, whereas small particles would enter the deepest part of the lungs, where it would be trapped in the air sac and be taken out through the cilia movement mechanism.</td>
</tr>
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<td>Nitrogen Oxide</td>
<td>• It reacts similarly like ozone and sulphur dioxide</td>
</tr>
<tr>
<td>Lead</td>
<td>• Exposure to high concentration of lead would spoil the blood, brain, nerves, kidneys, genitals, and immune system.</td>
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DISEASES CAUSED BY AIR POLLUTION

• **Chronic Bronchitis**
  
  *It is an inflammation on layers of the bronchus tube, causing cough. This disease can be caused by bacteria, air pollution, smoking and weather factors.*

• **Emphysema**
  
  *It is the abnormal growth of the lungs that troubles respiration.*

  *Most of the patients are smokers. If the spoilt lung cells continue on, the exchange of respiratory gases would be less efficient, forcing the heart to work harder.*
DISEASES CAUSED BY AIR POLLUTION

• **Asthma**
  Asthma is a reaction due to internal infection or allergic towards certain materials like pollen, dust, foods or emotion stimulants. An individual would experience difficult breathing and choke when an episode occurs.

• **Lung cancer**
  It is diagnosed from the presence of malignant cells on the outer layer of the respiratory system.

Among the causing factors are aging, smoking, genetics, race, viral diseases, career exposure.
THANK YOU