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Date: _____

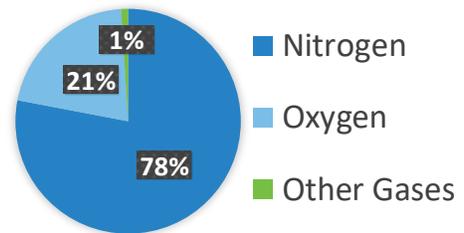
The Air You Breathe

Directions: Read the article below to learn more about the invisible ocean of air that surrounds you and sustains life on Earth. Use the Graphic Organizer to take notes as you read. Then complete the crossword puzzle.

We breathe six to ten liters of air every minute of every day. When you multiply 10 liters of air times 60 minutes in an hour and 24 hours in a day, it adds up to a lot of air! You can only survive two to three minutes without air, yet most of us never think about what's in the air we breathe.

Did you know our air is made up of an invisible mixture of gases that are essential to life on Earth? Nitrogen and oxygen are the most abundant gases in the troposphere, the layer of the atmosphere closest to Earth. Unfortunately, our air may also contain unhealthy levels of pollution that can enter our bodies and affect our health.

Air Composition



Air pollution is any substance in the air that can cause to human health or the environment. Air pollution can be made up of gases, like ozone, or small particles. Particle pollution consists of tiny particles of dust, dirt, smoke, and liquid droplets that may contain

Common Air Pollution Sources



chemicals or metals. Common sources of particle pollution include cars and other vehicles, smokestacks from factories or coal fired power plants, fireplaces and wood burning fire pits, construction sites, and unpaved roads or parking lots.

Particles are categorized by size. Coarse particulate matter (PM₁₀) is 10 microns or less in diameter. PM₁₀ is typically made up of dust, pollen, or mold. PM₁₀ is so small, you can fit five particles across the width of one human hair. Dust from construction sites and unpaved roads or parking lots are the most common sources of PM₁₀ in Maricopa County. Fine particulate matter (PM_{2.5}) is even smaller. These particles are 2.5 microns or less in diameter and are typically created through combustion. In Maricopa County, common sources of PM_{2.5} are car exhaust and wood smoke. PM_{2.5} is small enough to enter your lungs and even your bloodstream! This makes it very dangerous to human health. Compare the particle sizes in the image to the right. Keep in mind there are 25,400 microns in one inch! Remember, if you can see a particle, its diameter is greater than 50 microns. These large particles are generally filtered out by our noses before they can get into our lungs.

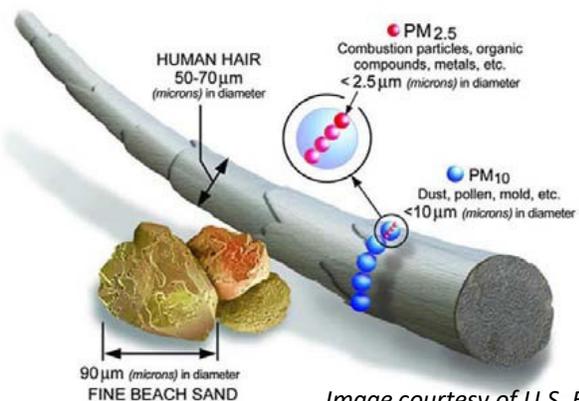


Image courtesy of U.S. EPA

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After a particle enters or forms in the air, the amount of time it stays aloft will depend on its size. In general, gravity pulls large particles down and out of the air faster than small particles. Many small particles stay suspended in the air for hours, days, or even weeks.

Sedimentation: gravity pulls particles down and they settle on a surface.

Condensation: water and other gases in the air collect on particles.

Coagulation: individual small particles collide and form larger particles.

The table below outlines the residence time (how long particles stay in the air) for three different sizes of particles:

Particle Size (Diameter)	Removal Process	Length of Time in the Air	Typical Distance
Ultrafine (1 micron)	Coagulation and condensation	Hours to days	Less than 100 meters
Fine (PM _{2.5})	Sedimentation	Days to weeks	100s to 1000s of kilometers
Coarse (PM ₁₀)	Sedimentation	Minutes to hours	10s of kilometers



Stop and Think Activities

1. Which type of particle stays in the air the longest and travels the furthest?
2. Which type of particle pollution is the most dangerous? Explain your answer.
3. We all play a role in keeping the air clean so we can all live, work, and play in a healthy environment. Think about your community. What particle pollution sources exist near your school or neighborhood? What steps can you take to reduce particle pollution and improve air quality in your community?