

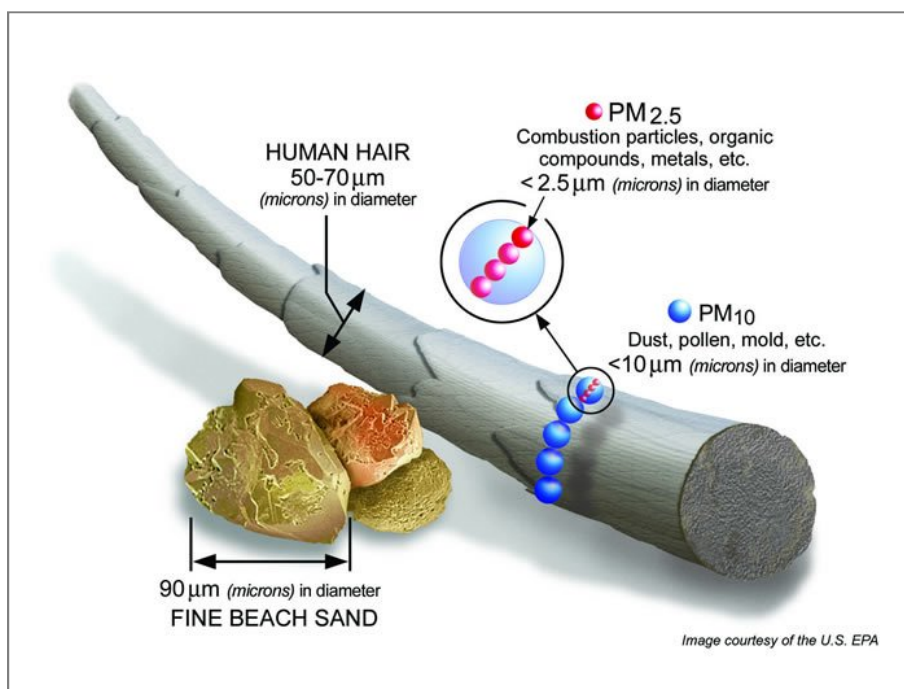
Particle Pollution Activity

In this activity, participants pretend to be cilia, tiny hairs that protect and filter out particles in the lungs. As cilia, participants wave their arms and smack away particulate matter in the form of paper wads.

Background Information

Particle pollution is a combination of tiny solid and liquid materials found in the air. Examples include dust, pollen, mold, and even metals. Potential sources include construction sites, unpaved roads, fires, power plants, industries, and automobiles.

Particle pollution includes “coarse particles” and “fine particles”. Coarse particles are larger than 2.5 micrometers in diameter and smaller than 10 micrometers in diameter. Fine particles are smaller than 2.5 micrometers in diameter. The largest fine particle (measuring 2.5 micrometers in diameter) is almost 30 times smaller than the average human hair (averaging 70 micrometers in diameter).



When inhaled, these particles can get deep into the lungs and, in some cases, into the bloodstream. According to the U.S. Environmental Protection Agency, numerous scientific studies have shown that exposure to particle pollution can trigger asthma and cause serious health problems including decreased lung function, irregular heartbeat, heart attack, and even premature death in people with heart or lung disease.

Objectives

As a result of this activity, participants will:

- Understand what particle pollution is.
- Identify sources of particle pollution.
- Understand the health problems associated with particle pollution and how our bodies work to protect us from particle pollution.
- Identify ways to reduce particle pollution.

Estimated Time

15 minutes

Materials and Instructions to Create Model

Swim noodle

Golf ball

Grain of sand

Use the items above when discussing particle pollution. Show participants the image on page 3 of human hair, fine beach sand, and particulate matter. Tell participants that the swim noodle represents a human hair, that the golf ball represents coarse particles, also referred to as PM_{10} in the image, and that the grain of sand represents fine particles, also referred to as $PM_{2.5}$ in the image.

Materials for Activity

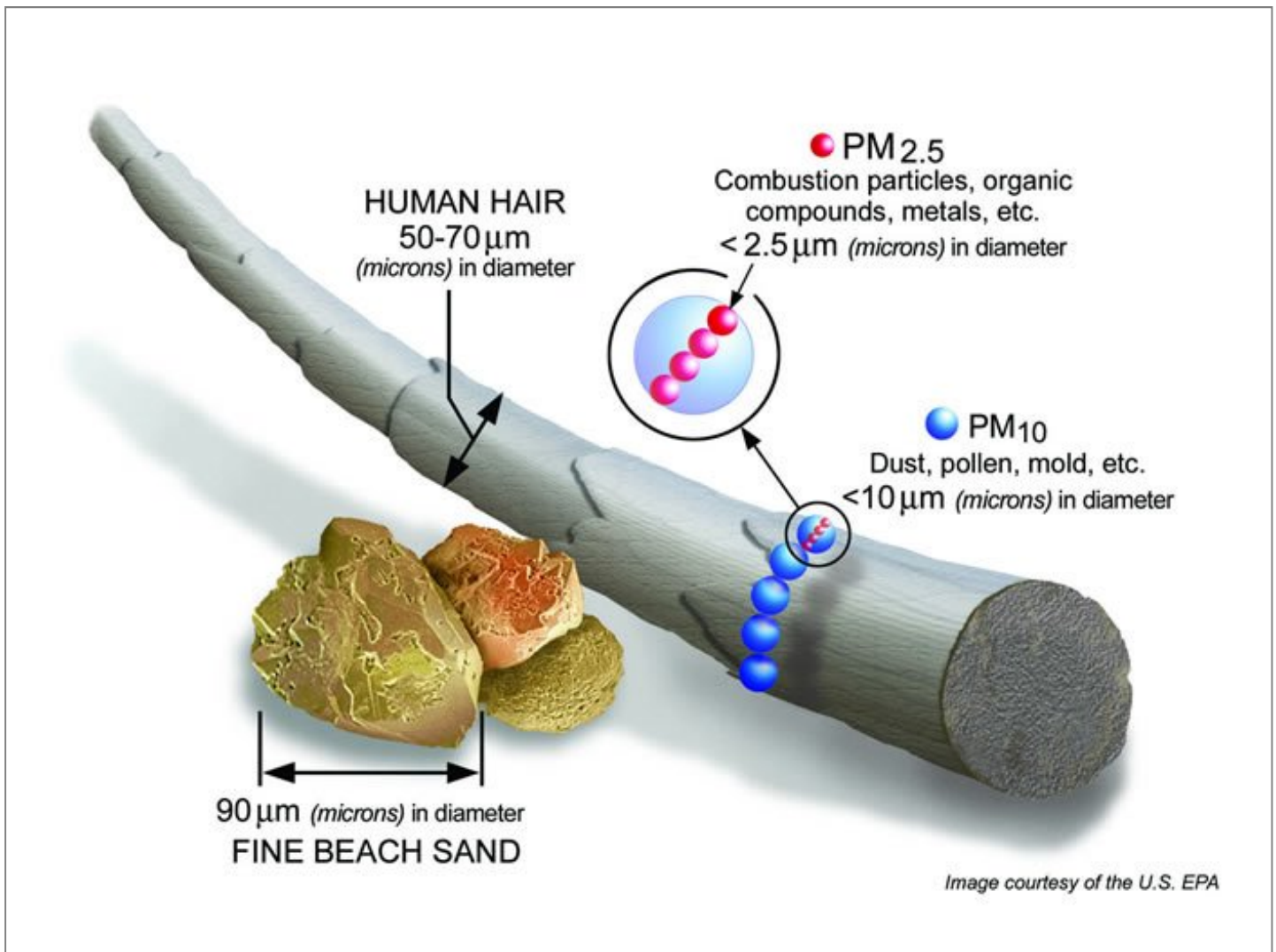
Baseball-size paper wads (25 +/- paper wads depending on the number of participants) – Note that these represent coarse particles in particle pollution.

Marble-size paper wads (50 +/- paper wads depending on the number of participants) – Note that these represent fine particles in particle pollution.

Instructions

1. Explain to participants what particle pollution is. Ask participants to name potential sources of particle pollution.
2. Use the image on page 3 and the model you created using a swim noodle, golf ball, and grain of sand to discuss coarse particles versus fine particles.
3. Discuss the health problems associated with particle pollution.
4. Tell participants that they are going to do an activity where each of them will pretend to be cilia. Tell participants that cilia are tiny hairs that protect and filter out dust and other particles in the lungs. Tell them that you will be throwing paper wads at them. The paper wads represent coarse particles in particle pollution (in the image on page 3 the coarse particles are also referred to as PM_{10}). Note that you will only be using the baseball-sized paper wads during this section of the activity. As cilia, participants are responsible for protecting the lungs from particle pollution (paper wads). Tell cilia (participants) to wave their arms and if a paper wad comes near them to smack it away. Depending on the size of the group you may need another volunteer to help you throw particle pollution (paper wads) at the cilia (participants).
5. After throwing particle pollution (paper wads) at the cilia (participants) ask the participants if it was easy or difficult protecting the lungs from the coarse particle pollution (paper wads).
6. Tell the cilia (participants) that they now will be protecting the lungs from fine particles in particle pollution (in the image on page 3 the fine particles are also referred to as $PM_{2.5}$). Note that you will only be using the marble-sized paper wads during this section of the activity. Tell the cilia (participants) to again wave their arms and if a paper wad comes near them to smack it away. Again depending on the size of the group you may need another volunteer to help you throw particle pollution (paper wads) at the cilia (participants).
7. After throwing particle pollution (paper wads) at the cilia (participants) ask the participants if it was easy or difficult protecting the lungs from the fine particle pollution (paper wads). Ask participants if it was easier or more difficult protecting the lungs from the coarse particles or fine particles.

8. Collect all the paper wads. Tell the cilia (participants) that they now will be protecting the lungs from fine and coarse particles in particle pollution. Note that you will be throwing both the baseball-sized paper wads and marble-sized paper wads in this section of the activity. Tell the cilia (participants) to again wave their arms and if a paper wad comes near them to smack it away. Again depending on the size of the group you may need another volunteer to help you throw particle pollution (paper wads) at the cilia (participants).
9. Discuss ways to reduce particle pollution with participants.
 - Examples of ways to reduce particle pollution in your home include prohibiting smoking indoors, reducing use of candles, woodstoves, and fireplaces, only burning dry, seasoned wood, making sure woodstoves are EPA-certified (and replacing woodstoves that are not EPA-certified), and never burning garbage.
 - Examples of ways to reduce particle pollution in general include using public transportation, carpooling, biking, or walking to reduce automobile emissions, and conserving energy.



Additional Resources

The Cilia (Not Silly!) Game - San Luis Obispo County Air Pollution Control District

<http://www.slocleanair.org/images/cms/upload/files/programs/kids/pdfs/Cilia%20Game.pdf>

References

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