

Particle Pollution Activity – Paper Wad Game



December 2020

Setting the Stage

- Tell students that they are going to play a game where each of them will pretend to be cilia - tiny hairs in the lungs that filter out dust and other particles we breathe in. They will have to block particles (paper balls) from going past them!
- Lead a discussion with students about how we know air pollution exists. Are air pollutants visible, can we use any of our senses to detect some or all of them?
- Have students give examples of visible air pollutants (e.g., smoke, dust, smog, etc).
- Define PM for the students by sharing the “Background Information” above. This information can also be found on the EPA website; the link is listed in the additional resources section at the end of this document.
- Use the materials you collected as props to model the relative size of particulate matter for students. Tell them the swim noodle represents a strand of human hair, the golf ball represents PM₁₀ and the grain of sand represents PM_{2.5} “fine particles” in the image.

Activity

1. Have students stand in an open area (outside, gym, etc.) at least an arms-length distance from one another. Tell them they are the cilia in lungs.
2. As cilia, students 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 (students).
3. After throwing particle pollution (paper wads) at the cilia (students), ask them if it was easy or difficult protecting the lungs from the coarse particle pollution (paper wads).
4. Tell the cilia (students) that they now will be protecting the lungs from fine particles (PM_{2.5} in the image). *NOTE: you will only be using the marble-sized paper wads during this section of the activity.*
5. Tell the cilia (students) 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 (students)

Activity (Cont.)

6. After throwing particle pollution (paper wads) at the cilia (students) ask them if it was easy or difficult protecting the lungs from the fine particle pollution (paper wads). Ask students if it was easier or more difficult protecting the lungs from the coarse particles or fine particles.

7. Collect all the paper wads. Tell the cilia (students) that they now will be protecting the lungs from fine and coarse particles in particle pollution. *NOTE: you will be throwing both the baseball-sized paper wads and marble-sized paper wads in this section of the activity.*

8. Tell the cilia (students) to again wave their arms and if a paper wad comes near them to smack it away.

9. Discuss ways to reduce particle pollution. Examples include:
 - prohibiting smoking indoors,
 - reducing use of candles, woodstoves, and fireplaces,
 - only burning dry, seasoned wood,
 - ensuring woodstoves are EPA-certified (and replacing woodstoves that are not EPA-certified),
 - never burning garbage, and
 - using public transportation, carpooling, biking, or walking to reduce automobile emissions.

Additional Resources

Reference

U.S. EPA. *Particulate Matter: Basic Information.* <https://www.epa.gov/pm-pollution>

Teens Health. *Lungs and Respiratory System.* <https://kidshealth.org/en/teens/lungs.html>