Unit B Bodyworks: Asthma and the Puget Sound Environment
Adapted from: NIH.gov, CDC Data briefs, National Heart Lung & Blood Institute (2013)
Puget Sound Clean Air Agency http://www.pscleanair.org

Purpose: I can explain how my lifestyle choices and our environment can directly affect my body systems.

What is asthma? Asthma (AZ-ma) is a chronic (long-term) lung disease that inflames and narrows the bronchioles inside the lungs. Asthma causes recurring periods of wheezing (a whistling sound when you breathe), chest tightness, shortness of breath, and coughing.

Background: Respiratory diseases like asthma, pneumonia, influenza and chronic obstructive pulmonary disease (COPD) are complex diseases caused by many factors. These two factors are:
1. Personal factors that include: gender, age, & genetic background.
2. Environmental, or outside, factors: exposure to environmental stimuli or “triggers” such as allergens, molds, air pollutants and tobacco smoke.

Asthma: Asthma affects people of all ages, but often starts during childhood. In the United States asthma cases increased from 7.3% in 2001 and then up to 8.4% in 2010. The asthma rate for children is about 2% higher than for adults. In 2010, about 25.7 million persons had asthma.

How does Asthma happen? When the airways encounter asthma “triggers”, the muscles around the airways tighten. These airways narrow so less air can flow into the lungs. The swelling can worsen, making the airways even narrower. Cells in the airways can make more mucus than usual. This sticky, thick liquid further narrows the airways. This chain reaction results in asthma symptoms.

What causes Asthma? The exact cause of asthma isn’t known. Researchers think some genetic and environmental factors interact to cause asthma, often early in life. These factors include:
- An inherited tendency to develop allergies
- Parents who have asthma
- Certain respiratory infections during childhood
- Contact with some airborne allergens or exposure to some viral infections in young children when the immune system is developing.
- Airborne irritants may also play a big role in adult onset asthma.

For example: Frequent exposure to irritants Ex: tobacco smoke, air pollution, pollen, some chemicals etc.) might make your airways more reactive to substances in the air as you age.
Where does the pollution that can trigger asthma come from? Most people with asthma have asthma attacks when exposed to irritants in the air. Air pollution from car exhaust, lawnmowers, or factories, for example, is one of the greatest causes of asthma attacks.

- People who live in a highly populated area, like the Puget Sound area, are often exposed to a greater number of airborne irritants. This can make life difficult and dangerous for those with asthma. Let’s take a closer look at one of these key airborne irritants, particulate matter.

What is Particulate Matter? Dust, dirt, soot, smoke – Are all considered “particulate matter.” These particles are easily inhaled into the lungs. Particulate matter poses a host of serious health effects, and represents the most important air pollutant challenge facing the Puget Sound region.

Particulate matter are tiny particles floating in the air. There are two classes of particles:

- **PM10** - particles that measure up to 10 micrometers in diameter; and
- **PM2.5** - fine particles measuring 2.5 micrometers in diameter or smaller

(Note: A human hair is about 70 micrometers wide. So PM10 and PM2.5 particles are a $1/7^{th}$ and $1/35^{th}$ of a hair.) These tiny particles are easily inhaled into our lungs and respiratory tracts.

- The smallest particles, PM2.5 are a big concern. That’s because their very tiny size allows them travel more deeply into our lungs and increases the potential for health risks.

Of the six key air pollutants monitored in the Puget Sound area, PM2.5 has the most serious health effects.

- Exposure to PM2.5 is linked with respiratory disease, decreased lung function, asthma attacks, heart attacks and premature death.
- Children, older adults and people with respiratory illnesses are especially at risk. These people should avoid outdoor exertion if PM2.5 levels are high.

Air Quality Status: We’ve made progress in reducing particle matter pollution over the past 15 years. However, PM2.5 levels in three of our four Puget Sound counties do not meet Federal standards at times.

Seasonal Sources of PM: In the winter, the most particle pollution comes from burning in fireplaces and wood stoves. During the summer, vehicle exhaust (cars, trucks, buses, lawn mowers, among others), land-clearing burning and backyard burning of yard waste are the major sources of fine particles.

Ways to help reduce PM in our air:

- Avoid wood-burning for home heating (use natural gas and propane);
- Reduce driving and choose cleaner cars and fuels.
- Refrain from lighting outdoor fires.

These are all steps we can take to reduce fine particle pollution. If we work together we can have cleaner air!
Please answer these questions in complete, quality and correct sentences reflecting the questions

1. Tell the two types of factors that combine to produce respiratory disease AND give an example of each factor.

2. Trends: Tell the trend in asthma from 2001 to 2010 AND compare the rate for children versus adults.

3. Briefly describe how an asthma attack happens.

4. Tell one factor researchers think causes asthma for children AND one for adults.
Unit B Bodyworks: Asthma and the Puget Sound Environment
Adapted from: NIH.gov, CDC Data briefs, National Heart Lung & Blood Institute (2013)
Puget Sound Clean Air Agency http://www.pscleanair.org

5. Explain why people with asthma, or other respiratory diseases, in the Puget Sound area are at a greater risk for getting attacks than people living in Eastern Washington.

6. Tell the two types of particulate matter.

7. Explain why PM2.5 particles are a big concern.

8. Describe how Puget Sound air quality rates compared to federal air quality standards.

9. Tell the sources of PM during the winter and summer and tell what can be done to avoid having these pollutants in our environment.