

Key Stage 4 AQA Physical Education & Physical Education (Double Award) 4890 GCSE

Lesson 1: “What happens to your lungs when you are exercising in polluted areas?”

This lesson will take 15 minutes

For Exams June 2014 onwards
Short Course, Full Course, Double Award.

Lesson Topics:

3.1 Units 1 and 3: Knowledge and Understanding for the Active Participant

<http://filestore.aqa.org.uk/subjects/AQA-4890-W-SP-14.PDF> page 7 and 9

CURRICULUM

The roles of the active participant:
Individual Differences:
Environment (pollution); Risk & Challenge
(safe participation).

CURRICULUM

Additional Content for Full Course:
3.1.2. Linking Physical Activity with diet, work
and rest for optimal health and a balanced
healthy lifestyle.

LESSON PLAN

Teacher Note: This lesson helps students understand the impact that breathing in polluted air can have on the human body, and that exposing oneself to high levels of outdoor air pollution impacts lung growth of those aged between 4 - 18. When students are conducting exercise outside, it is crucial for them to understand what happens in the lungs when they breathe faster, and that, wherever possible, highly polluted roads should be avoided at all times. This lesson does can be taught at the start of a class as it will only take approximately 15 minutes.

Part 1: Students will learn about the importance of air for healthy living by being taught in class or reading the reading exercise. This reading exercise can be of use to teachers in the class as well as students, and may be useful to be used as a handout for student exam and project revision. The exercise discusses briefly what aerobic respiration is, followed by the impact that breathing air pollutants can have on one’s health.

Part 2. This part has two tasks, the first includes a diagram which contains some questions for the students to answer. The second task includes a link to a recent study in Health Science, which shows that exercise outweighs the harmful effects of air pollution.

LEARNING OBJECTIVES

1. Students will be able to list the harmful effects of air pollution on the human body and explain how the environment can affect sports performance.

2. Students will be able to give advice to active performers in areas of poor air quality.

LESSON REQUIREMENTS:

- White board
- Reading material handouts
- Access to weblinks

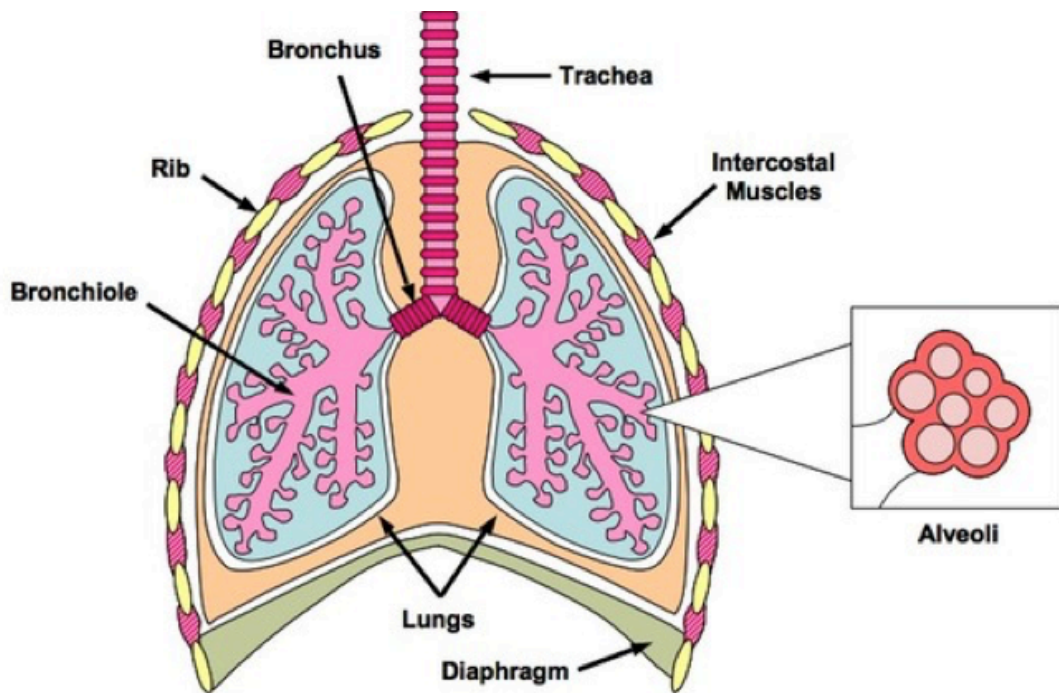
Part 1

Reading exercise

The human body is capable of remarkable performances and completing many complex tasks. When you are conducting an exercise activity you are aware of the diverse abilities of the human body and that training your body makes you stronger, or more efficient, for example.

Therefore, you will be aware of the importance of air for enabling the body to perform its tasks. About 21% of the air is made up of oxygen, which is required for aerobic respiration, which we need to stay alive.

Through healthy lung function, oxygen can reach our cells. The oxygen goes through the mouth/nose into the bronchus and then through the bronchioles before reaching the millions of tiny sacs called alveoli.



From this point, the process of gaseous exchange along the diffusion gradient (from high to low concentrations) ensures oxygen to pass into the blood, where it is then able to reach all cells and keep the cells all over our body functioning.

Question: Think of an activity that you have done before that makes you breathe very fast.

Why was this?

This is because the cells in our body were working much faster as a result of the physical activity and more oxygen was required and therefore had to be inhaled through the lungs - making our breathing faster.

Please read this extract from The MayoGroup

"While aerobic activity is one of the keys to a healthy lifestyle, air pollution and exercise can be an unhealthy combination. This is especially true if you have asthma, diabetes, heart or lung conditions, or lower respiratory disease.

Even when you're not exercising, exposure to air pollution can cause health problems. But with the combination of air pollution and exercise, the potential health problems are increased.

One reason for this increased risk may be that during aerobic activity, you usually inhale more air and breathe it more deeply into your lungs. And because you're likely to breathe mostly through your mouth during exercise, the air you breathe in generally bypasses your nasal passages, which normally filter airborne pollution particles.

Health problems that air pollution is associated with include:

- *Damage to airways of the lungs*
- *Increased risk of asthma development*
- *Worsening of existing asthma or other lung conditions*
- *Increased risk of heart attacks and strokes*
- *Increased risk of death from lung cancer and cardiovascular disease*

What's not clear with air pollution and exercise is how much exposure is a danger, or how long you have to be exposed. And because exercise has clear health benefits, don't give up on exercise entirely, unless your doctor has instructed you to. Instead, focus on ways to minimise the risks of the air pollution and exercise combination."

Source <http://www.mayoclinic.org/healthy-living/fitness/expert-answers/air-pollution-and-exercise/faq-20058563>

Part 2

Task 1

Study the diagram below. It shows you several of the health effects upon human bodies that result from exposure to air and water pollution.

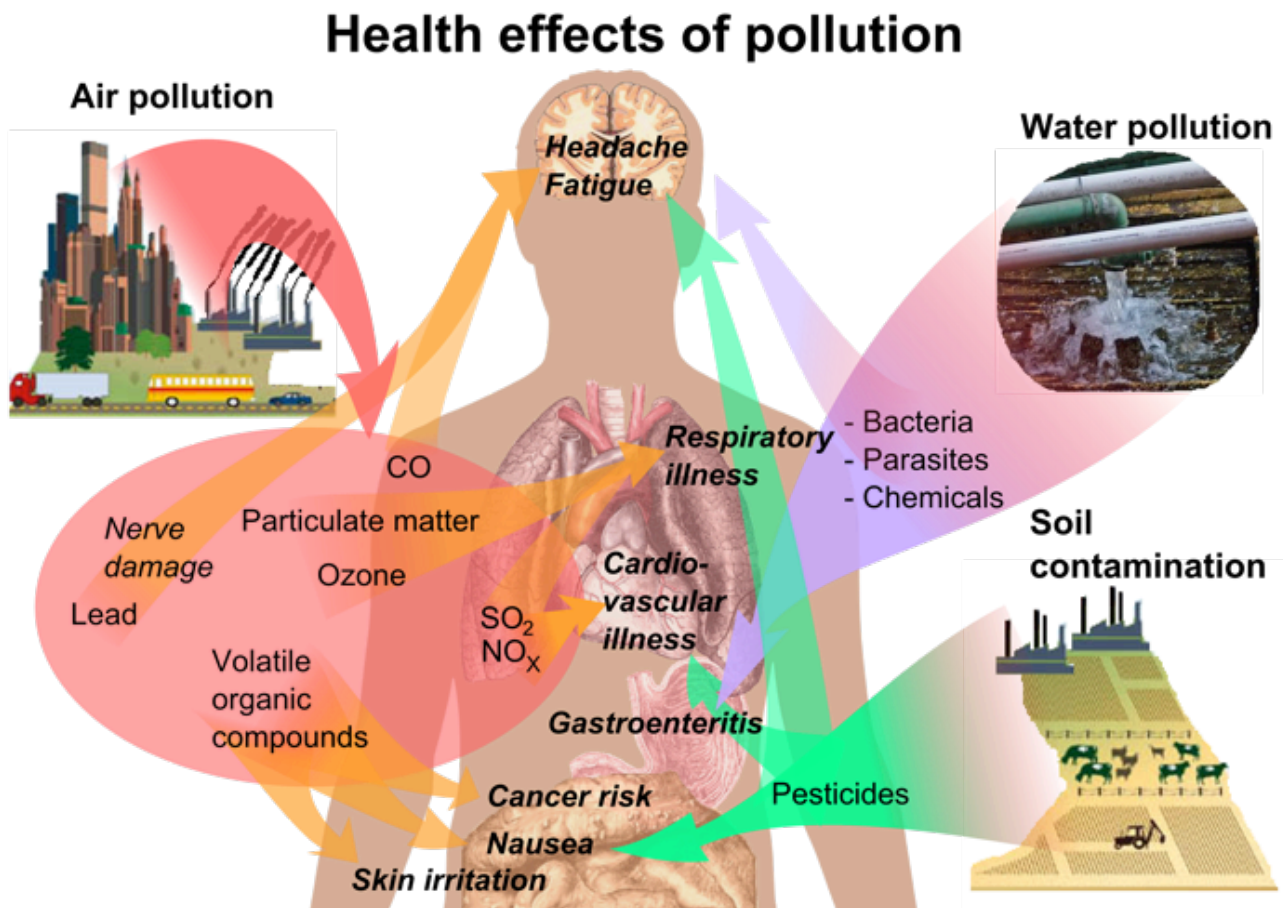


Image Source: http://commons.wikimedia.org/wiki/File:Health_effects_of_pollution.png

Task 2

Please read the article (link below), which compares exercise and air pollution on the health of our bodies.

<http://healthsciences.ku.dk/news/news2015/exercise-can-outweigh-harmful-effects-of-air-pollution/>

Knowledge of the article and diagram is necessary to answer the following questions:

- Q1. Which of these effects do you consider to be most detrimental to human health?
- Q2. Do you think athletes / people exercising are more at risk to the effects of air pollution than people who are not exercising as strenuously? Explain your answer.
- Q3. How might you adjust a training program for an athlete living in an area of high air pollution?