

Ben Can't Breathe ¹

Answer Key

Instructions

Compare your answers to the questions in the story to the answers and ideas listed in this key. Discuss the answers and any differences of opinions with your friends and the instructor. Your ideas are important and can help to improve this exercise. Therefore, please don't mark additional answers or change the answers you marked on your answer sheet.

Question A

- T 1. Mold and fungi grow in the wet chicken manure and wood chips and make tiny spores that get into the dust.
- T 2. Many insects and mites live in the feed and manure among the wood chips. Their waste products and dead body parts become part of the dust.
- T 3. A lot of chicken feed spills into the chips. Fine pieces of the feed also become part of the dust.
- T 4. As the manure dries, it becomes powdery and is part of the dust.
- T 5. Billions of bacteria grow in the mixture of chips, feed, and manure. The bacteria produce spores that are found in the dust.
- T 6. Ammonia (NH₃) is a major product found in chicken manure. It can be present in concentrations high enough to irritate the tiny air sacs (alveoli) in the lungs.
- F 7. Termites can't live in the wood chip and manure mixture because the regular cleaning out of the poultry house destroys their mud tunnels.
- T 8. Chicken feathers, down, and tiny pieces of skin are called dander. Very fine particles of chicken dander are also part of the dust.

Question B

- T 9. However, a mask alone won't stop inhalation of the particles. Some particles are small enough (microscopic) to get through a paper mask. Only NIOSH approved paper masks with two rubber bands should be used. One band goes around the head above the ears and the other around the neck below the ears.
- T 10. High-efficiency particulate air (HEPA) filter cartridges should be used with the respirator. A respirator will keep nearly all dust out of a person's lungs if: (1) it fits correctly, (2) is kept clean, and (3) the filter cartridges are replaced when they become dirty.

¹ This answer key is to be used with the "Ben Can't Breathe" exercise problem booklet.

- T 11. Wetting down chips, bedding, moldy hay, or straw before moving the material is an effective method for reducing dust levels.
- F 12. With more frequent cleaning there would be less mold, fungi, and bacteria, and fewer organic particles in the dust inhaled. But there would still be plenty of harmful organic particles in the dust. A respirator would still be needed.
- T 13. A large exhaust fan installed at one end of the poultry house, with a door left open at the other end, can remove nearly all of the dust as the chips and manure are removed. The person who cleans out the chips should start with his or her back to the open door and work toward the fan. As the work is completed fresh air surrounds the worker and the dust is drawn out of the building.
- F 14. This is a common but wrong idea! A bandana may keep large pieces of material like bugs and chips out of a person's mouth and nose, but provides no protection from the small organic particles that are breathed deep into the lungs.

Question C

- T 15. Shoveling grain is often very dusty. The grain dust, bacteria, molds, fungi and insect poop found in the grain are organic particles that can be dangerous to a person's lungs.
- T 16. Combining grain releases silica dust, soil particles, weed pollen, and other organic particles. Combining in an open cab without wearing a respirator can result in a person inhaling a huge number of particles in just a few breaths.
- T 17. After breathing dust from moldy silage, many farmers have developed burning in their eyes and throat, headache, and cough. Fever, chest discomfort, and weakness follow within 4 to 12 hours. Silage mold causes some people to develop "Farmer's Lung," a chronic allergic reaction that can be fatal.
- T 18. Animal manure contains many types of bacteria and fungi, as well as pneumonia germs. Ammonia gas (NH₃) is also present. All of these can irritate and inflame a person's lungs when they inhale this mixture.
- T 19. Compost decays before it is ready to be used as fertilizer. While it decays it is full of mold and fungi. The compost needs to be turned over as it cures. Handling compost at this stage without a respirator or without good ventilation can be bad for a person's lungs.
- F 20. Putting fuel into a tractor does not expose a person to organic dust. However, it does expose the person to dangerous organic vapors. A dust mask or ordinary respirator provides no protection from these vapors. The best practice is to fuel tractors in the open and stay upwind of the vapors. Gasoline contains benzene and benzene is known to cause cancer.

- T 21. Baling, loading, and handling hay bales, especially in an enclosed barn, is a very dusty job. The dust contains hay and weed pollen, insect poop, soil and silica dust, mold spores, and many other organic particles that can cause some people to have breathing problems, allergic reactions, and asthma attacks.

Note: Ben wondered why his Dad and Granddad could work in the dust and not get sick. Some people are less sensitive to the organic particles in dust. They can work around dust for years and not have illness or lung damage. Other people are very sensitive to dust and can develop chronic and disabling lung disease from exposure to dust. This is the case for Ben. It is also true that some people can work around mold, dust and other organic particles with no apparent respiratory problems and then suddenly develop a serious and life threatening allergic reaction to the same dust in which they have worked for many years. It is often impossible to tell who will become sick from working in dust. The only way to prevent respiratory illness is to avoid breathing the dust. Wearing respirators or working with good ventilation are two of the best ways to do this.

Question D

- F 22. Pneumonia is a bacterial lung infection that may be cured with proper medication. Farmer's Lung often looks and feels like pneumonia, but medications can't cure it. Like pneumonia, Farmer's Lung can cause a person's lung to fill with fluid.
- F 23. Farmer's Lung is called Hypersensitivity Pneumonitis (HP). It is not a tumor. It is scarring of cells in the lungs. As the lungs continue to be exposed to dust and other irritants, more lung tissue becomes scarred and fewer healthy lung cells remain to help a person breathe.
- T 24. Farmer's Lung is called Hypersensitivity Pneumonitis (HP). HP develops when a person's lungs are allergic to certain organic particles. When a person breathes these particles, tiny air sacs (alveoli) in their lungs react by swelling. The swelling takes up lung space and prevents getting enough air. Over time, more and more tiny air sacs become scarred. As more lung tissue is damaged, the lungs become less flexible and less able to expand. Breathing becomes more and more difficult.
- F 25. Smoking increases the likelihood of a person's lungs reacting to organic particles, but Farmer's Lung, or Hypersensitivity Pneumonitis (HP), is not caused by smoking. HP is not a form of emphysema. Emphysema is an over-filling of air sacs with old air that gets trapped. Smoking often results in emphysema and many smokers die from this condition.

Question E

- T 26. The cost of Ben's treatment and his inability to continue working create difficult financial problems for his family. Mary may have to work off the farm in order to pay the bills and keep the farm.

- T 27. With HP, many people end up needing a machine (a ventilator) to breathe for them. Sometimes the person enters a coma because of a lack of oxygen to the brain. By planning ahead of time, Ben can let his family and doctor know if he wants to be placed on a ventilator to prolong his life, or if he wants to be allowed to die. He needs to make this decision while he is still able to do so.
- T 28. If Ben’s medical bills become very high, and his family is unable to produce the income needed to run the farm and pay for Ben’s treatment, they may have to sell the farm.
- T 29. Many people with Farmer’s Lung are unable to continue working. Fatigue, shortness of breath, persistent cough, and weakness may force a farmer to quit farming. Even if the farmer is physically able to work, low levels of dust exposure may trigger severe breathing problems. The farmer may not be able to live on or even visit a farm.
- T 30. Ben’s Farmer’s Lung may become so severe that he is unable to leave his bed for very long, if at all. The family will have to provide 24-hour care for Ben. His inability to contribute to the running of the farm also will have a severe economic and emotional impact on the family.
- F 31. Wearing an air-purifying respirator can prevent Farmer’s Lung because it keeps organic dust particles out of the lungs. But, it’s too late for Ben. His lungs are badly damaged. A respirator won’t help him to breathe. If he had worn an air-purifying respirator when he worked in dust (as his doctor told him to do), Ben wouldn’t have developed Farmer’s Lung disease.

Finding Your Score

Compare your answers to those on the answer key. Count the number you got correct.

If you got _____, you are:

29-31	Expert
25-28	Pretty good
16-24	Trying
0-15	In big trouble