Chapter 02
Test Bank: The Air We Breathe

1. Of five major gaseous components of air, which is the only one to vary significantly in concentration from place to place and from day to day?
A. Water vapor
B. Carbon dioxide
C. Nitrogen
D. Argon

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.02
Subtopic: Study of Chemistry
Topic: Study of Chemistry

Feedback: Think about differences in humidity.

2. Which two gases make up more than 95 percent of an inhaled breath?
A. NO_2 and N_2
B. CO_2 and O_2
C. O_2 and N_2
D. N_2 and Ar

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.02
Subtopic: Study of Chemistry
Topic: Study of Chemistry

Feedback: Think about the two main components of the atmosphere.

3. What is the primary component of an exhaled breath?
A. N_2
B. O_2
C. CO_2
D. H_2O

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.02
Subtopic: Study of Chemistry
Topic: Study of Chemistry

Feedback: The main component of an exhaled breath is the same as the main component of an inhaled breath.

4. Which component of the air makes up approximately 100 times more of an exhaled breath than of an inhaled breath?
A. Ar
B. O_2
C. O_3
D. CO_2

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.02
Subtopic: Study of Chemistry
Topic: Study of Chemistry

5. The _____ concentration in the air over the desert differs dramatically from that in the air in the tropical rainforest.
A. N_2
B. O_2
C. CO_2
D. H_2O

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.02
Subtopic: Study of Chemistry

Topic: Study of Chemistry

Feedback: Think about the dry air in the desert.

6. Which component of the air is an element?
A. H_2O
B. NO_2
C. O_2
D. CO_2

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.02
Subtopic: Elements
Subtopic: Molecules
Topic: Components of Matter
Topic: Study of Chemistry

Feedback: Only one of these contains all the same type of atom.

7. Air is a(n)
A. element.
B. compound.
C. mixture.
D. pure substance.

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.02
Subtopic: Classification of Matter
Topic: Components of Matter

Feedback: There are several substances in air.

8. Which substance is not considered to be an air pollutant?
A. N_2
B. SO_2
C. NO_2
D. O_3

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.04
Section: 02.08
Subtopic: Classification of Matter
Topic: Components of Matter
Topic: Study of Chemistry

Feedback: One if these is the primary component of uncontaminated air while the rest are pollutants.

9. Ozone is considered an air pollutant in the _____ but is a valuable protective layer in the _____.
A. troposphere; stratosphere
B. stratosphere; mesosphere
C. stratosphere; troposphere
D. mesosphere; stratosphere

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.08
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: Remember that we live in the troposphere.

10. A particular sample of air is 2.5 percent water vapor. Express the concentration of water vapor in parts per million (ppm).
A. 0.0000025 ppm
B. 0.025 ppm
C. 250 ppm
D. 25000 ppm

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.04
Subtopic: Measurements
Topic: Study of Chemistry

Feedback: Percent is parts per hundred. One hundred is 10,000 times less than one million.

11. The EPA limit for CO is 9 ppm. Express this number as a percentage.
A. 90 percent
B. 9 percent
C. 0.09 percent
D. 0.0009 percent

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.04
Subtopic: Measurements
Topic: Study of Chemistry

Feedback: Percent is parts per hundred. One hundred is 10,000 times less than one million.

12. Which pollutant is present in air as particulate matter?
A. Soot
B. Ozone
C. Sulfur dioxide
D. Carbon monoxide

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.08
Subtopic: Fundamental Definitions
Topic: Study of Chemistry

Feedback: Particulate matter is solid not gaseous.

13. What two factors are considered when determining the risk assessment for air pollutants?
A. Exposure and ppm
B. Percentage and ppm
C. Toxicity and percentage
D. Toxicity and exposure

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.09
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: Remember that some things are poisonous in a short time frame and others are toxic after long time frames.

14. When assessing the risk of an air pollutant, which does not play a role in considering someone's exposure to the pollutant?
A. A person's lung capacity
B. A person's breathing rate
C. The toxicity of the pollutant
D. The concentration in air of the pollutant

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.09
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

15. The burning of coal produces sulfur dioxide, SO_2, a pollutant that slowly reacts in air to form SO_3. Sulfur trioxide dissolves into airborne water droplets to form a very corrosive solution of sulfuric acid. Which is a product of burning coal that hastens the transformation of sulfur dioxide into sulfur trioxide?
A. Carbon dioxide
B. Carbon monoxide

C. Nitrogen dioxide
D. Particles of ash

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.13
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: This transformation takes place on solid particles.

16. All of these pollutants can be detected by their odors except
A. CO.
B. O_3.
C. SO_x.
D. NO_x.

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.08
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: Remember that you might need a detector for this substance in your home for protection.

17. Which pollutant are you more likely to encounter in dangerous concentrations indoors rather than outdoors?
A. Nitrogen dioxide
B. Carbon monoxide
C. Ozone
D. Sulfur dioxide

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.15
Subtopic: States of Matter
Topic: Environmental Chemistry

Feedback: This comes from the incomplete combustion of hydrocarbon fuels.

18. In general, which airborne material is not likely to be affected by the filters or indoor air handling equipment?
A. Particulates
B. Pollen
C. Soot
D. Carbon monoxide

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.15
Subtopic: States of Matter
Topic: Environmental Chemistry

Feedback: Filters cannot trap gases.

19. Which color, as used in the Air Quality Index, warns that the level of a pollutant is hazardous, the most dangerous level?
A. Orange
B. Green
C. Yellow
D. Maroon

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.10
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: This is similar to other color-coded warning systems.

20. Based on its name, which carbon compound contains the fewest carbon atoms?

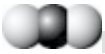
A. Ethanol
B. Methane
C. Chlorobutane
D. Propyl alcohol

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.07
Subtopic: Nomenclature
Topic: Components of Matter

Feedback: Mother Eats Peanut Butter.

21. P_2O_5 is the chemical formula for
A. pentoxygen diphosphide.
B. diphosphorus pentoxide.
C. dioxygen pentaphosphide.
D. monophosphorus pentoxide.

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.07
Subtopic: Nomenclature
Topic: Components of Matter

22. The name of the compound formed by combining carbon atoms  with oxygen atoms  to form  is
A. carbon oxide.
B. monocarbon dioxide.
C. carbon dioxide.
D. carbonate.

Bloom's Level: 2. Understand
Chapter: 02
Section: 02.07
Subtopic: Measurements
Topic: Components of Matter

Feedback: Count your atoms and remember that there is no prefix on a lone element that is named first.

23. Choose the proper coefficients for each substance to balance this equation.
___ $C_2H_4(g)$ + ___ $O_2(g)$ → ___ $CO_2(g)$ + ___ $H_2O(g)$
A. 1, 1, 2, 2
B. 1, 3, 2, 2
C. 2, 3, 4, 2
D. 2, 2, 4, 2

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.11
Subtopic: Chemical Formulas
Subtopic: Writing and Balancing Chemical Equations
Topic: Chemical Reactions
Topic: Components of Matter

Feedback: Make sure that the total number of each element is the same on both sides of the equation.

24. Choose the proper coefficients for each substance to yield a balanced equation.

A. 1, 1, 1
B. 2, 1, 1
C. 2, 1, 2
D. 1, 1, 2

Bloom's Level: 3. Apply
Chapter: 02
Section: 02.11
Subtopic: Chemical Formulas

Subtopic: Writing and Balancing Chemical Equations
Topic: Chemical Reactions

Feedback: Make sure that the total number of each element is the same on both sides of the equation.

25. Which is the balanced chemical equation showing hydrogen peroxide (H_2O_2) decomposing into hydrogen (H_2) and oxygen (O_2)?
A. $H_2O_2 \rightarrow H_2 + O_2$
B. $H_2 + O_2 \rightarrow H_2O_2$
C. $2\ H_2 + O_2 \rightarrow 2\ H_2O_2$
D. $2\ H_2O_2 \rightarrow 2\ H_2 + O_2$

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.11
Subtopic: Writing and Balancing Chemical Equations
Topic: Chemical Reactions

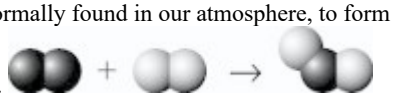
Feedback: Make sure that the total number of each element is the same on both sides of the equation.

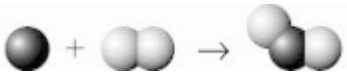
26. Which is the balanced chemical equation for the reaction of nitrogen (N2) with oxygen (O2) to form NO?
A. $2\ NO \rightarrow N_2 + O_2$
B. $N_2 + O_2 \rightarrow NO$
C. $N_2 + O_2 \rightarrow 2\ NO$
D. $NO \rightarrow N_2 + O_2$

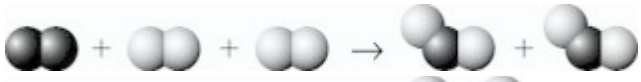
Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.11
Subtopic: Writing and Balancing Chemical Equations
Topic: Chemical Reactions

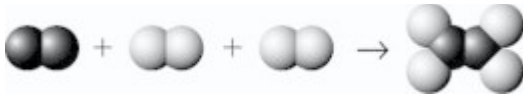
Feedback: Make sure that the total number of each element is the same on both sides of the equation.

27. Which shows the balanced equation for the reaction of nitrogen (), as it is normally found in our atmosphere, with oxygen (), as it is normally found in our atmosphere, to form nitrogen dioxide?

A. 

B. 

C. 

D. 

Bloom's Level: 2. Understand
Chapter: 02
Section: 02.11
Subtopic: Writing and Balancing Chemical Equations
Topic: Chemical Reactions

Feedback: Oxygen and nitrogen are diatomic molecules as found in nature.

28. Green chemistry is
A. the study of how to improve the production of oxygen via photosynthesis.
B. any chemistry having an agricultural base.
C. the cause of the higher temperatures and humidity typically found in greenhouses.
D. the design of products and processes that reduce hazardous substances.

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.16
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: This is about cleaner chemistry in all fields.

29. Catalytic converters reduce the amount of _____ in car exhaust.
A. O_3
B. CO_2
C. CO
D. N_2

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.13
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: Think about which is a direct tailpipe pollutant.

30. Ozone is a secondary pollutant. A secondary pollutant is
A. not as hazardous as a primary pollutant.
B. not produced directly but as the product of the interaction of two or more pollutants.
C. one that is naturally present in our atmosphere.
D. one that is less hazardous than a primary pollutant.

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.14
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: This has nothing to do with safety.

31. There are approximately 2×10^{22} molecules and atoms in each breath we take and the concentration of CO in the air is approximately 9 parts per million. Approximately how many CO molecules are in each breath we take?
A. 2×10^{15}
B. 1.8×10^{17}
C. 2×10^{16}
D. 2×10^{29}

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.04
Subtopic: Dimensional Analysis / Unit Conversion
Subtopic: Measurements
Subtopic: Scientific Notation
Topic: Components of Matter

32. Which of the following would be described as "fine particles?"
A. SOx
B. NOx
C. O_3
D. 2.5 μm diameter soot

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.08
Subtopic: Classification of Matter
Topic: Components of Matter
Topic: Environmental Chemistry

Feedback: Remember that these are solids and not gases.

33. The lowest (or closest to the ground) layer of our atmosphere is the
A. troposphere.
B. ozone layer.
C. stratosphere.
D. mesosphere.

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.02
Subtopic: Environmental Chemistry

Topic: Environmental Chemistry

Feedback: Think about which layer we live in and that is its relative warm.

34. Balance this equation $P_4 + Cl_2 \rightarrow PCl_5$ with the smallest whole number coefficients. Choose the answer that is the sum of the coefficients. (Do not forget coefficients of "one.")
A. 7
B. 9
C. 11
D. 13
E. 15

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.11
Subtopic: Writing and Balancing Chemical Equations
Topic: Chemical Reactions

Feedback: Be sure to balance all elements on either side of the equation and add all the coefficients including any "ones."

35. Which of the following are examples of technological advances that have reduced air pollution?
X Paint with reduced VOCs
X Catalytic converters
__ Burning gasoline in leaf blowers
X Low sulfur diesel fuels

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.16
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: One of these is a major cause of outdoor pollution while the others are improvements.

36. If 500 mL of air contains 2×10^{22} particles (atoms and molecules), how many particles do you inhale in one day if you breathe 15000 L of air?
A. 2×10^{22}
B. 6×10^{26}
C. 1.2×10^{27}
D. 5×10^{24}

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.01
Subtopic: Dimensional Analysis / Unit Conversion
Subtopic: Measurements
Subtopic: Scientific Notation
Topic: Components of Matter

Feedback: Remember that 500 mL is 0.5L and make sure your units cancel when you do the calculation.

37. If we assume that the top of Mt. Everest is the highest land mass on earth, hikers who scale its summit are standing in the
A. mesosphere.
B. stratosphere.
C. troposphere.
D. ozone layer.

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.02
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: Remember that they are still on land and this layer encompasses all the land.

38. The chemical formula for nitrogen monoxide is
A. N_2O.
B. NO.
C. NO_2.
D. N_2O_3.

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.07
Subtopic: Nomenclature
Topic: Components of Matter

Feedback: Remember your prefixes for naming molecules.

39. Which correctly pairs an indoor pollutant with its source?
A. Formaldehyde and unvented space heaters
B. O_3 and electrical arcing
C. Radon and glues and solvents
D. Nicotine and paint and paint thinners

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.15
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

Feedback: Think about the sources of nicotine, radon, and formaldehyde.

40. An inversion layer happens when a certain weather pattern traps cooler air near the surface of the earth with a warmer air mass above it. Why is this a problem?
A. Excess precipitation could cause flooding
B. The cold air increases the chance for snowstorms
C. Heatwaves can occur
D. Air pollution concentrates in the inversion layer

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.05
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

41. What is the chemical formula for carbon disulfide?
A. CH_4
B. CS_2
C. C_2H_6
D. H_2SO_4

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.07
Subtopic: Components of Matter
Topic: Components of Matter

Feedback: Remember your prefixes for naming molecules.

42. How many carbon atoms does the molecule octane have?
A. 0
B. 2
C. 4
D. 8

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.07
Subtopic: Components of Matter
Topic: Components of Matter

43. Currently, the primary source of sulfur dioxide emissions into the atmosphere is
A. coal burning power plants.
B. diesel trucks.
C. plastic manufacturing.
D. gasoline-powered lawnmowers.

Accessibility: Keyboard Navigation

Bloom's Level: 1. Remember
Chapter: 02
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Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

44. The more toxic the pollutant, the higher the concentration is set when concerning air quality standards.
FALSE

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.09
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

45. Even though the concentration of air pollution has gone down over time, people in some metropolitan areas still breath are that contains unhealthy levels of pollutants.
TRUE

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.10
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

46. Which is the correct balanced equation for the complete combustion of ethane in excess oxygen?
A. $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$
B. $2\ CH_4 + 3\ O_2 \rightarrow 2\ CO + 4\ H_2O$
C. $2C_2H_6 + 7\ O_2 \rightarrow 4\ CO_2 + 6\ H_2O$
D. $2\ C_2H_6 + 5\ O_2 \rightarrow 4\ CO + 6\ H_2O$

Accessibility: Keyboard Navigation
Bloom's Level: 2. Understand
Chapter: 02
Section: 02.12
Subtopic: Chemical Reactions
Topic: Chemical Reactions

47. Which chemical components are given off in car exhaust?
A. CO_2
B. H_2O
C. NO_x
D. All of these choices are correct

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.12
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

48. In metropolitan areas, the concentration of ozone in the atmosphere drops at night. Why?
A. Wind blows away the ozone at night
B. Energy usage goes down at night
C. There are less cars on the road at night
D. The formation of ozone requires sunlight

Accessibility: Keyboard Navigation
Bloom's Level: 3. Apply
Chapter: 02
Section: 02.14
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

49. Which air pollutant is the second-leading cause of lung cancer worldwide, behind tobacco smoke?
A. Radon
B. Ozone
C. Carbon monoxide
D. Nitrogen oxides

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.15

Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

50. What is the greatest source of indoor air pollution in developing countries?
A. Unvented space heaters
B. Cookstoves
C. Automobiles
D. Paint

Accessibility: Keyboard Navigation
Bloom's Level: 1. Remember
Chapter: 02
Section: 02.15
Subtopic: Environmental Chemistry
Topic: Environmental Chemistry

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